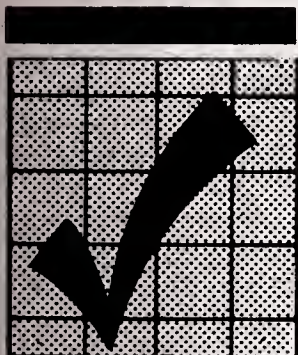


COMPUTERWORLD

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FEBRUARY 11, 1985

VOL. XIX, NO. 6



Change for the better?
Software Benchmark on Micropro International Corp.'s Wordstar 2000/18

Transmitting at 1.54M bit/sec
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In Depth
An anonymous programmer sounds off
Follows 80

In Depth
Meet Peter Benton **ID/11**

IBM adds disk drives

Models seen paving way for Sierra series

By Donna Raimondi
CW Staff

RYE BROOK, N.Y. — In a move analysts said paves the way for the awaited Sierra line of mainframes, IBM last week released two additional versions of its 3380 disk drive and dramatically increased the cache memory capacity of its 3880 Models 21 and 23 disk controllers.

Highlights of the announcement included the following:

- Two 3380s, which IBM is calling Extended Capability models, in single- or double-capacity versions. The double-capacity models can store up to 5.04G bytes of data. The single-capacity models offer the same amount of

storage as earlier 3380s but are field upgradable to the double-capacity units. Users of older 3380s cannot upgrade to the 3380 models announced last week.

- Expanded cache memory capabilities for the 3880 Models 21 and 23 disk controllers, which use 256K-bit memory chips, to as much as double the cache capacity of the 3880 models. The Models 21 and 23 now have a cache capacity of 48M or 64M bytes.

- A series of software enhancements that appears to support the newly announced storage devices (see story page 9).

The Extended Capability models also
See **IBM** page 7

Decade-old IBM 3420 drive hot item in tight market

By Tom Henkel
CW Staff

While some users are queuing up to buy initial models of IBM's 3480 cartridge tape drive, its 12-year-old predecessor, the 3420, has also become a hot commodity in recent months. According to one dealer of used IBM hardware, used models of the 3420, particularly the top-end Model 8, are selling for close to the IBM list price for new units. Furthermore, used IBM 3803 Model 2 tape controllers, designed for use with the 3420 Model 8, are selling for nearly twice as much as IBM's current list price.

The reason for the unusually high

prices for used hardware stems from what industry watchers contend is a temporary shortage of 3420 tape units, apparently brought on by a decrease in IBM production and Storage Technology Corp.'s recent financial problems.

Industry analysts claim that when IBM announced the 3480 last March, it slowed production of the 3420, presumably so it could build more 3480s. But "IBM underestimated the demand for start/stop tape drives," noted Al Tinker, a vice-president at Memorex Corp., who claimed his company is having a field day booking orders for

See **DEMAND** page 4

Salary gap pervades DP

Women earn 22% less than men working in same positions

By Donna Raimondi
CW Staff

Women in computer professions earned almost 22% less last year than men in the same jobs, according to figures released recently by the Bureau of Labor Statistics.

Despite this disparity, earnings in the computer field still outshine those of most other professions. For example, while women in computing earned 78.2% of what men made in 1984, the median income for women in all jobs last year was only 65% of that for men, the BLS figures showed.

The BLS study is the most recent to point out the significant differences in salaries between men and women computer professionals.

A study conducted last year indicated even sharper salary differences between men and women professionals in data processing than the BLS survey did. Furthermore, those differences were found between men and women with the same educational backgrounds and job experience.

Joyce Currie Little, who initiated the study last year, is chairwoman and a professor in the computer and information sciences department of Towson State University in Baltimore. She gathered information from local community college alumni who graduated in 1978 with associate degrees in computer science.

Her dissertation, "Computer Career Patterns of Associate Degree Graduates from Data Processing Technology Programs in Public Community Colleges," will be published by Dissertation Abstracts International.

Little said she found no significant differences in the educational level or job satisfaction between the men and women surveyed, but she did find that women were clearly at the bottom of the heap in terms of salary. She said she learned that the average yearly salary for men was \$32,085 vs.

See **WOMEN** page 6

Minis form micro net hub

By Edward Warner
CW Staff

NEW YORK — What some said will be the next wave in end-user computing — departmental minicomputers supporting clusters of personal computers — is a reality in the wholesale operating group at Manufacturers Hanover Trust Co. here.

The wholesale group, a vertically integrated operating group responsible for credit and cash management services, has connected at least 18 Wang Laboratories, Inc. minicomputers at the bank's headquarters here with department-level clusters of Wang's Professional Computer. All of the group's 100 Wang micros are linked to the minis, as are the group's Wang word processing terminals. The clusters include anywhere from

one to 50 personal computers.

The Wang micros store data on the minis — at one location they have access to 32M bytes — and the minis act as file servers and gateways to the IBM 3081 and 3084 mainframes of the bank's central data processing operation. The minis provide shared peripherals for their clusters, including shared Xerox Corp. 2700 laser printers at three cluster sites.

Using the Wang mini as a communications server, a Wang Professional Computer user can access Manufacturers Hanover's companywide electronic mail system routed through two Digital Equipment Corp. PDP-11/70 minicomputers or even send documents over the high-speed leased lines of the bank's Geonet network, a

See **NETWORK** page 4

TOP OF THE NEWS

A Los Angeles man was indicted for illegally accessing federal computers and will be charged under the new law pertaining to illegal entries into government computers. **Page 2.**

At least one user has received delivery of IBM 3480 tape drives and found that they lived up to expectations in initial trials. **Page 4.**

Apple no-show. Office Automation Conference '85 attendees noted the absence of Apple Computer, Inc. **Page 11.**

It's a first. That is what Intel Corp. is saying about its concurrent processing system based on multiple nodal processors. **Page 87.**

They had to sell or go public. The cofounder of McCormack & Dodge Corp. speaks out on the challenges the company has met during the past 16 years. **Page 119.**



NEWS

DP worker charged with hacking

Grand jury cites recent federal computer crime law

By Mitch Betts
CW Washington Bureau

DENVER — A federal grand jury here last week indicted a 26-year-old Los Angeles man on charges of illegally accessing computers at the Colorado offices of the U.S. Department of Agriculture (USDA). The indictment is based on a new law that specifically outlaws breaking into the federal government's computers.

The indictment alleges that Philip Gonzalez Fardiquela, a computer operator at a company the indictment did not identify, used the communications networks at GTE Telenet Communications Corp. and Tymnet, Inc. to access computers illegally at the USDA's Forest Service regional offices, according to Cathy Goodwin, assistant U.S. attorney here.

The defendant allegedly dialed into the Tymnet network, then made unauthorized use of a special password to enter the Telenet network, from which he directed calls into USDA computers, according to Claudia Houston, spokeswoman for GTE Telenet. A USDA spokesman declined to discuss the case because it is subject to continuing investigation and litigation. Goodwin said it was not clear what the suspect did or intended to do with the USDA data files.

The indictment resulted from a joint investigation by Denver's U.S. Attorney's Office and the Federal Bureau of Investigation, according to Robert N. Miller, U.S. attorney here. Miller said that GTE Telenet, Tymnet, Pacific Bell Northwest Telephone Co. and the USDA cooperated in the investigation.

Indictment contains seven charges

The indictment, issued Feb. 5, contains seven

charges, which include the following: four misdemeanor charges brought under the new federal law against breaking into federal computers, two counts of felony wire fraud and one felony count for making false statements to a federal agency, Goodwin said.

Goodwin said the indictment states that the defendant gained unauthorized access to computers at the USDA's Denver regional office and the Forest Service's Fort Collins, Colo., office, inserted false user codes and passwords into the computer programs and made printouts of information from the computer files.

She said the charges cover a period from Dec. 22 through Jan. 26. The FBI seized computer equipment owned by the suspect Jan. 26 and arrested him Feb. 6 at his Los Angeles home, Goodwin said.

Last year, Congress enacted the Computer Fraud and Abuse Act of 1984 that specifically makes it a crime to gain unauthorized access to the federal government's computers [CW, Oct. 15]. Under the new law, illegally accessing a federal computer to use or modify unclassified information is a misdemeanor; the first offense carries a maximum penalty of one year in prison and a \$5,000 fine, and repeat offenses carry a maximum penalty of 10 years in prison and a \$10,000 fine.

"GTE Telenet strongly supported this act during congressional hearings in 1984, and we are working this year to expand the law to protect private-sector computers as well," GTE Telenet President J. David Hadd said in a statement.

The alleged trespass was first identified and traced by Kevin Abt, director of quality management at GTE Telenet in Vienna, Va., Miller said. "We spotted the [unusual] traffic the first day it happened," GTE Telenet's Houston added.

USC looks for phony degree records

By Kathleen Sullivan
CW West Coast Bureau

LOS ANGELES — Officials at the University of Southern California (USC) are investigating allegations that counterfeit degrees, supported by transcripts that were illegally placed in the university's computer system, were sold for as much as \$25,000 each.

According to Sylvia Manning, USC's vice-provost, the alleged phony degree scheme was uncovered by the Drug Enforcement Administration in Louisville, Ky., during the course of a drug investigation. At present, both the Los Angeles County District Attorney's office and the university are conducting probes on the allegations.

Neither Manning nor the district attorney's office investigator would comment further on the case or the methods allegedly used to place tran-

scripts in the computer system. At press time, Manning said the university had found no evidence of phony transcripts or sales of fake degrees. As a result of the charges, USC has broadened an ongoing investigation into illegal tampering with the university's computer system.

Last June, a USC employee was dismissed when the university found she had altered grades on student transcripts, selling five grade changes for \$1,500. Manning said there is evidence that an even more extensive grade-change operation was in place, in which passwords and access codes were used to gain access to the system.

The university has tightened its computer security measures since the first investigation began, installing an audit trail system and creating a system that will allow USC to perform computerized postaudit checks of transcripts, Manning said.

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Complex and difficult to learn but has potential as an applications writing tool — this and other observations about Ada were offered by two early users of the programming language/8

In conjunction with the introduction of two enhanced models to its 3380 Dasd family, IBM has announced enhancements to programs in its Data Facility software series/9

Phillips Petroleum Co. is teaching one group of its employees that using personal computers can be an enjoyable experience/10

CW at OAC: Apple Computer, Inc. was conspicuously absent from the vendor exhibitions . . . Advance planning and employee involvement at all levels were key to the successful implementation of office automation systems at three companies . . . Data General Corp. and Digital Equipment Corp. announced new and enhanced products designed to bolster their positions in the office automation arena/11-13

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In a small room in a Puerto Rican observatory are three superminicomputers that help scientists study objects billions of light-years away/40

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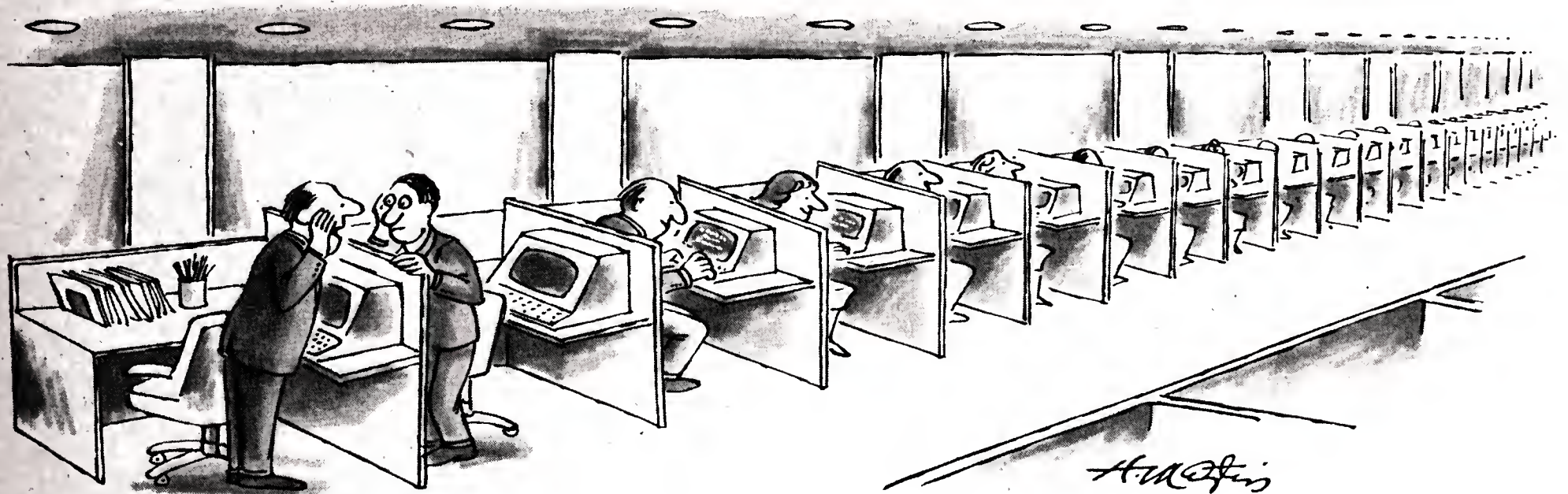
CORRECTIONS

The Dexpo West '84 booth highlighted in the Dec. 17 issue of *Computerworld* was that of Interactive Systems, Inc. of Lowell, Mass.

Exxon Corp. has suspended manufacturing in

its Lionville, Pa., office systems subsidiary. However, Exxon Office Systems Co., the subsidiary, continues manufacturing for the parent company and other third-party customers [CW, Jan. 21].

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NEWS

Waiting game ends for one user of IBM 3480 subsystem

By Jeffry Beeler
CW West Coast Bureau

ORANGE, Calif. — In computer rooms throughout the U.S., customers are nervously pacing the floor like expectant fathers as they await deliveries of IBM's Model 3480 tape drive subsystem.

For at least one Southern California company, the protracted wait ended Jan. 4, when two strings of the 3480s arrived at the doorstep of TRW Information Services, Inc., a credit bureau operator whose data base contains millions of financial histories.

Three days later, the eight 3480 storage modules and their two controllers were installed and soon thereafter went into limited production use, according to Al Dewey, director of TRW's computing operations.

In subsequent benchmark tests, TRW dumped data from both its 3380 and 3350 disk systems to the newly arrived 3480s and then compared the observed transfer rates with those of the company's existing 3420 tape drive systems.

When attached to the 3380s, the 3480s yielded 40% to 100% faster job runtimes than the 3420s, Dewey said. With the 3350s, meanwhile, the 3480's performance edge reportedly dipped to 20% to 30%.

"The reason we got different test results with different models of disk systems is that the 3380 [unlike the older 3350] is equipped with data-streaming channels," Dewey explained. "The degree of performance improvement we observed during the benchmarks was pretty much what we expected."

Introduced last spring [CW, March 26], the 3480 reportedly accepts data transfers at speeds of up to 3M byte/sec, compared with a maximum of 1.2M byte/sec for the 3420. The 3480 also occupies significantly less floor space than its IBM predecessor, Dewey said, and uses built-in message units to avoid I/O errors.

Not surprisingly, therefore, the 3480 has already won widespread acclaim as a highly desirable successor to the aging 3420, which has remained a mainstay of Big Blue's product line since its introduction in 1973.

But the 3480 also has its reported drawbacks. Because the 3480 and 3420 store their tape in different forms — cartridges and reels, respectively — acquisition of the newer model storage devices may lead in some cases to conversion woes.

Another even more serious problem currently afflicting would-be 3480 users is the product's simple lack of availability. Even today, nearly a year after its industry debut, the tape system has yet to find its way into customers' hands in large volumes.

Nor do many users expect the dearth to end anytime soon. Sungard Recovery Services, Inc., for example, sees little chance at present of receiving its requested shipment of two 3480 strings before mid-year, according to Bill Flounders, the firm's vice-president of operations.

Until recently, the Philadelphia-based supplier of systems-backup facilities was advised not to expect its 3480s to be shipped until 1986 or possibly even 1987. Since then, however, Sungard's delivery schedule is said to have been greatly accelerated,

largely in response to user lobbying efforts. "IBM informed us that it had been pressured by our customers to ensure that Sungard's 3480 shipments received top priority," Flounders said.

But even with recent improvements, Sungard's delivery timetable still pales in comparison to TRW's. At first, TRW was slated to receive its cartridge tape systems around June or July, but when it objected, IBM responded by hastening the arrival date twice: first to the end of January and then to the beginning of this month, Dewey said.

The improvement in shipment schedule has thrust TRW into the enviable position of being among the 3480's earliest recipients. "Because we're so close to Tucson, Ariz., where the 3480s came from, it's conceivable we were the first customer to get them," Dewey said.

Intended mainly for archival storage and backup of the company's huge collection of on-line credit histories, each of TRW's 3480 strings contains one controller and four storage units with two tape transports.

To date, the bulk of the firm's archival files still resides in its long-installed 3420s. But as the files gradually lose currency and give way to more recent historical information, the reel tape systems will be retired and replaced with cartridge-type modules. By year's end, TRW expects its arsenal of 3480s to have expanded to four or five strings, Dewey said.

Reel tape systems, however, are unlikely to disappear from TRW entirely, he added. Because some of its clients may continue to use 3420s indefinitely, TRW will probably have to do likewise.

NETWORK from page 1

system that connects its New York headquarters with various branches overseas.

The development of minicomputer-based personal computer clusters at Manufacturers Hanover was largely pioneered in the bank's Financial Services Group (FSG), a client of the wholesale group, according to Robert Petrie, the group's vice-president for end-user computing. Petrie was formerly in charge of support for end-user computing in the FSG.

In 1983, Petrie said, the FSG had been looking for a means to interconnect its growing number of personal computers with the several Wang minicomputers already in use, largely for terminal-based word processing. When Wang, in May 1983, announced a Petrie board for its Professional Computer that would provide the personal-computer-to-mini connection, Petrie added up the figures and found "it was as cheap to get a Wang [Professional Computer] as [it was] to get a workstation. "We immediately seized upon that," he said.

Though the use of minis as host departmental networks of personal computers has yet to catch on in Manufacturers Hanover as a whole, the wholesale group and FSG in particular are "carrying the word to the masses," Petrie said.

The minis in use by the wholesale group for its clustering scheme range from the Wang VS85 to the Wang VS100 at the high end and from the Wang OIS/60 to the Wang OIS/140 at the low end. One VS100 is supporting 50 Professional Computers.

Petrie said the biggest benefit of the clusters has been the savings that come from sharing peripherals, especially printers and micro-to-mainframe communications boards.

Another benefit, he said, is that the users can still use the Wang word processing software, a package they already understand, and have access to larger amounts of disk storage.

In the future, Petrie said he would like to add automatic backup of user files, most of which are now stored on the mini. Software for that function is now being tested by the wholesale group, though Petrie noted that "ideally, I would like to see the users exercise the discipline to back up their personal files."



CW photo by E. Warner

Throughout the bank, though, IBM Personal Computers still outnumber Wang Professional Computers. The 200 IBM micros in the wholesale group, for example, hold a two-to-one edge. The bank, however, does not connect IBM Personal Computers to minis but links them to IBM mainframes over its Geonet network, a coaxial cable system that terminates in RS-232 sockets in every office at the headquarters.

An interface board under review by Petrie's office would allow the IBM micros to tie in with the Wang minis. That board, a Wang spokesman said, is the Wang Systems Network Option for the IBM Personal Computer.

Manufacturers Hanover, Petrie said, is also looking with great interest at IBM's announcement of plans to strengthen the connection between its Personal Computer and its System/36 mini and already has a System/36 on order for pilot testing as a departmental host.

IBM, meanwhile, announced in October 1983 the enhancement of its Displaywrite Personal Computer word processing program that would allow it to interchange documents with the System/36 and even the IBM 370.

DEMAND from page 1

3420-compatibles and 3803 Model 2 controllers.

An IBM spokesman said the company has not shipped the 3803 Model 2 controller since September, when a components shortage forced IBM to halt production. The shortage has recently been resolved, IBM said. IBM maintained it has never been slow in shipping 3420 tape drives, claiming the units are available four months after order placement.

Fueling IBM's 3420 shortage have been the financial problems experienced by Louisville, Colo.-based STC International Data Corp. (IDC), a Framingham, Mass.-based market research firm, said STC had held the lead in selling 3420-compatible products. When STC filed for protection under Chapter 11 of the Federal Bankruptcy Act last October, some concerned customers apparently went running back to IBM trying to buy 3420s.

Svend Hartman, president of Computer Merchants, Inc., a Chappaqua, N.Y., dealer in used IBM hardware, noted that the January edition of the firm's "Computer Price Guide" listed single-density 3420 Model 8 units as selling at 91% of the IBM list price. The IBM double-density model was selling at 93% of the IBM list cost. The publication also indicated the 3803 Model 2 tape control unit to be selling at 160% of the IBM list price, with units costing roughly \$44,000, compared with the IBM list price of \$27,550.

David Vellante, an analyst with IDC, contended that the popularity of the 3420 and 3803 is a temporary situation.

According to Vellante, "3480 orders are outrageous. People who have not bought tapes in some time" are planning to buy the 3480. The IDC analyst predicted that not only will the 3420 shortage decline quickly, but orders for the older tape units will also decline.

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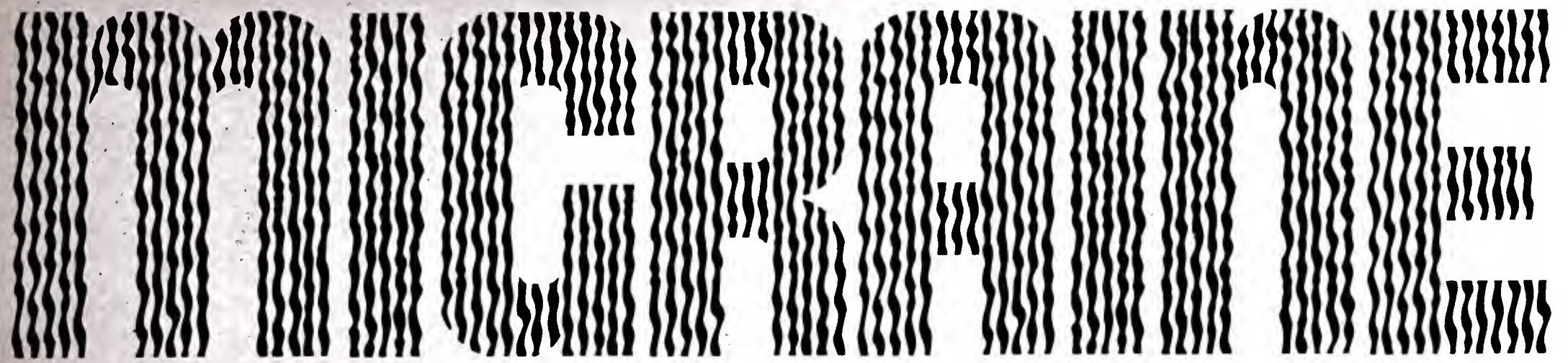
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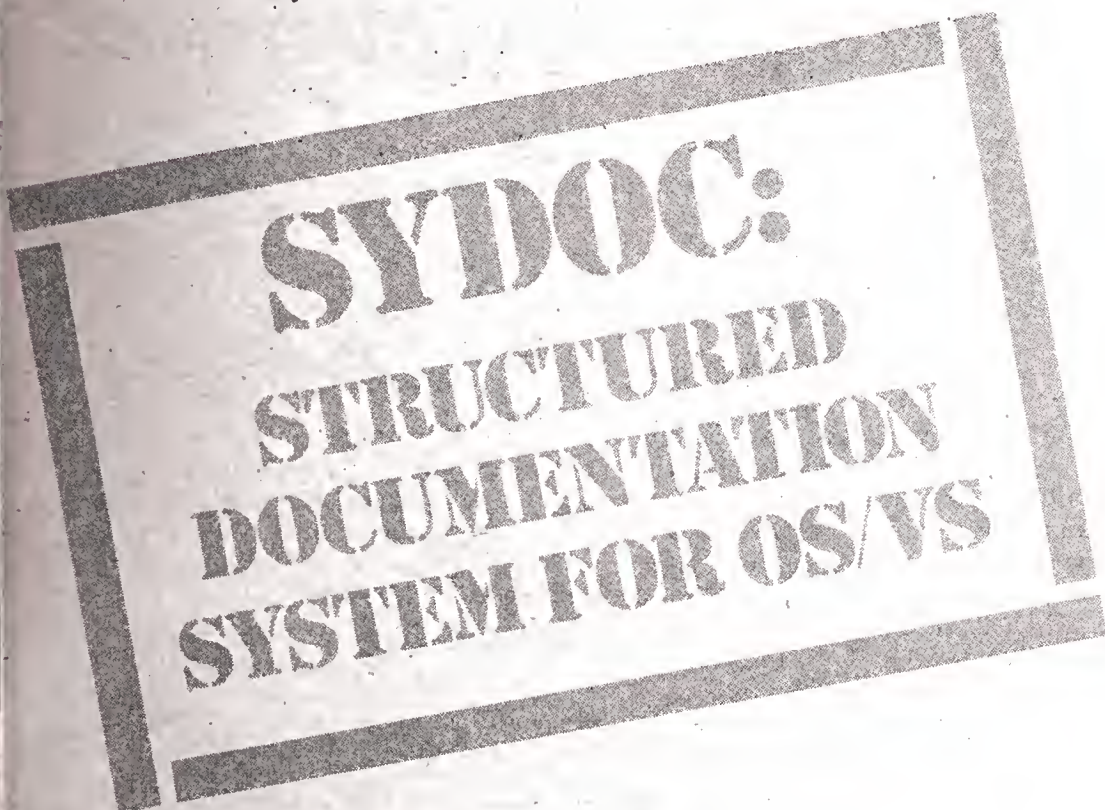
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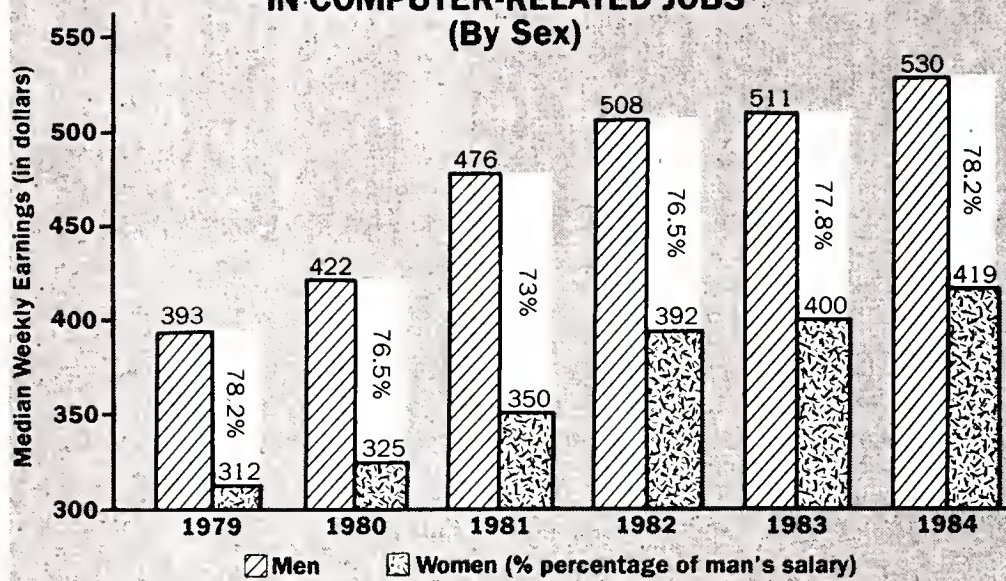
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NEWS

**COMPARISON OF MEDIAN WEEKLY EARNINGS
IN COMPUTER-RELATED JOBS***
(By Sex)



*Includes computer system analyst/scientists, operations and systems researchers and analysts, computer programmers and computer equipment operators

CW CHART

WOMEN from page 1

\$22,050 for women.

Little pointed out that some of the people polled in her study had been working in the field but did not have credentials until they went through the two-year college program, which might account for part of the difference. She used a sample of 80 graduates of Baltimore Community College, 59 of whom were still in computer-related jobs.

While differences in salary exist for experienced men and women in data processing, this is not the case for those just starting out in the field, according to personnel agencies specializing in the computer industry.

There is no difference in the starting pay of men and women in data processing jobs, said Robert Half, president of the Robert Half EDP Personnel Specialists job search firm. "In some cases, a woman is a novelty and can get even more money than a man," he said.

According to Wayne Emigh, vice-president and general manager of Source EDP Personnel Services, Inc., a job search agency for computer professionals, men and women placed by his firm receive the same starting pay for the same jobs. But women are not as aggressive as men in asking for more pay, Emigh said after polling five of his staff counselors who place job seekers. When seeking a new job,

women tend to place emphasis on job content and satisfaction, and men place emphasis on salary, he added.

Another study by the Scientific Manpower Commission (SMC), a statistical collection agency of the American Association for the Advancement of Science in Washington, D.C., confirmed that starting salaries for men and women in DP almost match.

Men who graduated with B.S. degrees in computer science were offered average starting salaries of \$24,828 in 1984, said Betty M. Vetter, SMC executive director. Women graduates with the same degrees from the same programs were offered an average of \$24,060, she said. "The starting pay for computer science graduates is close but not quite equal,"

Vetter said, and five years into their careers, women's salaries are considerably below men's.

Why do salary discrepancies develop? One possible explanation is suggested in the the "Dewar's Career Profile: Computer Professionals," a 1983 study of 301 computer professionals. The study, which was performed by the Dewar's Center for Career Development established by the Schenley Imports Co., found that women do not spend as much time on the job as men. A third of the men interviewed and only a tenth of the women polled spend 51 or more

”
Woman do not spend as much time on the job as men.
— Dewar's career study

”
'There's a single word for it — prejudice.'
— Betty M. Vetter SMC

hours a week at their jobs, the study showed; half of the women but only a fifth of the men worked 40 or fewer hours a week.

Companies want people to put in a lot of hours on their way up the corporate ladder,

Half said. As an employee climbs to the top, there is more responsibility and more need for decision making, which requires more time on the job, he added. If women are not spending as much time as men on the job, that may contribute to the salary disparity, he said. Employers do not specify that they want employees who will work long hours, Emigh noted. They do say, however, that they want an employee who will occasionally work long hours, or they specify a time period in which overtime will be expected. Women are as apt to take those jobs as men, he said. More than 90% of men in

the computer professions have college degrees, the Dewar's study showed, and three-quarters of the women have such degrees.

Although not broken down by sex in the study, 73% of all computer professionals' backgrounds are in mathematics, computer science, electrical engineering and other sciences.

Women have earned more than 40% of all mathematics-related degrees for several years now, according to Scientific Manpower's Vetter. As far back as the 1960s, she said, women have earned more than 30% of math degrees. "They are not Johnny-come-latelies," she said. As to why women in computer professions earn less than men in the same fields, she said, "There's a single word for it — prejudice."

Job agencies offer pointers to aspiring women workers

"Ask for it" is Robert Half's advice to women in computer professions who want to earn more money and get ahead.

The president of Robert Half EDP Personnel Specialists, the job search firm that bears his name, said to have a list of achievements — big or small — in mind when going to the boss seeking a salary increase or a higher position. An employer will not ignore the request of a good employee, and will consider the risk of losing one who has asked for a raise or promotion.

"If you're ever so slightly better than everyone else, you'll get along," Half said. Most workers are mediocre, and it does not take that much effort to be better than average, he said. Make sure when you ask for something that you are good enough to warrant it, because if you are not, you risk losing the job.

Get a computer science degree and top it off with a master's degree in business administration, said Wayne Emigh, vice-president and general manager of Source EDP Personnel Services, Inc. Emigh said that according to a minipoll he conducted among the five most successful women on his staff, there are six additional points to consider for a woman who wants to get ahead as a computer professional:

- Identify your salary and professional goals for a five-year period.

- Determine what responsibilities and skill levels you have to achieve to reach those objectives.

- Set a series of milestones, and then establish a plan, and set a time frame in which to achieve them.

- Let the decision makers in your organization know what your goals are, and ask them for advice on how you can achieve them.

- Ask for more responsibility or training that will afford you an opportunity to broaden your skills.

- Do not be bashful about asking for salary increases or promotions if you are qualified.

The Source EDP job counselors that Emigh polled stressed that women should express expectations of their jobs and of management in a diplomatic and clear manner. All of Emigh's advice presupposes that the woman delivers a high-quality performance.

"You have to work twice as hard and be twice as good, and you still won't get the same recognition that men get," said Betty Vetter, executive director of the Scientific Manpower Commission, a statistical collection agency that is part of the American Association for the Advancement of Science that is based in Washington, D.C.

A man is assumed to be competent until he proves otherwise, but a woman is assumed to be incompetent until she proves otherwise many times over, Vetter said.

Women will know that they do not have to worry about pay discrimination when they can be as mediocre as many men have been and still advance as men have, she added.

ICL eyeing Soviet plant?

LONDON — International Computers Ltd. (ICL), Britain's No. 1 computer maker, last week labeled as "speculative" published reports that it is planning to build a \$100 million-plus computer factory in the Soviet Union.

The company acknowledged that senior ICL executives did meet with Russian trade officials last December, including Yevgeni Valikhov, the Soviet minister in charge of microcomputer development plans. ICL executives at the meetings included Peter Bonfield, managing director, and

members of the company's East European marketing department.

But those meetings, ICL said, were courtesy calls by the Soviets covering general trade relations topics between ICL and the Soviet Union.

Britain's Ministry of Trade and Industry declined to comment on the matter.

Meanwhile, another British company, Rair, which designs microcomputer products for marketing by ICL, said it would be willing to cooperate with ICL should such a project with the Soviets materialize.

Feature to target micro impact

The use of micros in corporate America has not been without problems. The April Special Report on "Microcomputers in Big Business" will focus on MIS tactics for integrating micros into the corporate information system, trends in business-related micro hardware and software and security risks.

Contributions should be either tutorials, discussing an issue or trend, or application stories outlin-

ing a user firm's experience.

Articles must be four to six typed, double-spaced pages. Artwork is welcome. Authors should include a brief biography and a telephone number.

The deadline for submissions is March 5. Send stories or questions to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

NEWS

IBM from page 1

low users to double the amount of 3380 disk storage without increasing the floor-space requirements.

The newly announced 3380s are said to offer up to a 15% increase in performance over the three standard IBM 3380 units when used in MVS/XA environments and up to 5% when operating in IBM 370 mode. The units have the same relative arrangement of tracks and cylinders as standard models.

Single-density Extended Capability versions, Models AD4 and BD4, feature the same capacity (2.52G bytes) as the standard models and are field-upgradable to the dual-density models.

The twofold increase in storage capacity is said to be the result of unspecified advances in disk technology and design improvements in the recording heads that write information on the disks and retrieve it. The double-capacity Models AE4 and BE4 have twice as many tracks on each disk platter. An IBM spokesman said specific details of the head disk assemblies used in the newly announced 3380s is proprietary information.

Device configuration sequencing

The Extended Capability storage devices were designed to share 3380 storage control units with standard 3380 models, but old and new 3380s cannot be mixed on the same string. Models BD4 and BE4 can be intermixed in any sequence within strings

headed by either a Model AD4 or a Model AE4. Strings headed by Models AA4, AD4 and AE4 can be paired in any combination on any two properly configured 3380 Storage Control Model 3 storage directors or on 3380 Storage Control Model 23 storage directors in a single- or dual-frame configuration.

The single-capacity Models AD4 and BD4 cost \$88,780 and \$64,440 per unit, respectively, and will be available in March. They can be converted to double capacity at the customer's location at a cost of \$45,960 in the fourth quarter of 1985, the vendor said. The 5.04G-byte double-capacity Models AE4 and BE4 cost \$134,740 and \$110,400, respectively, and will be available in the fourth quarter of 1985.

The Extended Capability models have been designed with fewer com-

ponents in the power system, the read/write channel and the control electronics. This is said to reduce the opportunity for failure. Consequently, the minimum monthly maintenance charges on all Extended Capability models has been reduced by 10% over standard models, the vendor said.

Cache memory expansion

The maximum cache memory capacities of IBM 3380 Models 21 and 23 storage control units, which were introduced last fall and use IBM's 256K-bit chip technology, have been expanded from 32M bytes to 48M or 64M bytes.

The models were expanded to increase the rate at which data is transferred between the storage subsystem and the main memory and to provide support for the new 3380 Ex-

tended Capability Dasd units.

The newly announced 3380 Models H21 and J21, with cache capacities of 48M and 64M bytes, respectively, are said to offer higher probabilities that page data that the host requests for transfer to it will be found in the cache memory and transferred without mechanical delays.

The 3380 Models H23 and J23, with respective cache memory capacities of 48M and 64M bytes, are said to offer performance increases in host access to frequently used application data.

The larger cache memory capacities will be available in the first quarter of this year. Purchase price is \$349,975 for a 48M-byte unit and \$429,975 for a 64M-byte unit.

IBM's Systems Products Division is located at 900 King St., Rye Brook, N.Y. 10573.

Upgrade block irks 3380 users

While one IBM 3380 disk drive user is impressed with the enhanced technology in IBM's newly announced 3380s, he is unhappy that his existing drives cannot be upgraded to the new models.

Arthur Norz, general manager of the Greenville, S.C., computer center of Metropolitan Life Insurance Co., called the double-capacity drives "a step in the right direction," while lamenting his inability to upgrade. He was scheduled to have five 3380s delivered the day after the announcement (see story above).

Norz is not overly concerned that the value of his current stock of 3380s may be diminished by IBM's announcement. "If I was going to sell them, I'd be concerned about the value. But I'm not going to sell them," he said.

One man who owns quite a few 3380 drives is a bit more concerned about their value. Richard Forsythe, president of Forsythe McArthur Associates, Inc. of Skokie, Ill., a computer leasing company, said most users who lease hope the drive can sell for 50% of its purchase price.

"What we don't know is if the new units will cause everyone to give back the old ones," said Forsythe, who is also the current chairman of the Computer Dealers and Lessors Association. If 3380s are dumped on the marketplace as leases expire, he said, their value will drop significantly.

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MESSAGE	ID	UCB	LABEL	OPTION	PASS	FILE NO	RECORDS	LOCATION	LENGTH
FATS204	TAPE2	281	987654					1607 FT	4 IN
FATS204	TAPE2	281	987654					1607 FT	8 IN
FATS204	TAPE2	281	987654					1608 FT	13 IN
FATS204	TAPE2	281	987654					1608 FT	17 IN
FATS204	TAPE2	281	987654					1608 FT	21 IN
FATS204	TAPE2	281	987654					1609 FT	26 IN
FATS204	TAPE2	281	987654					1609 FT	30 IN
FATS204	TAPE2	281	987654					1609 FT	34 IN
FATS204	TAPE2	281	987654					1610 FT	39 IN
FATS204	TAPE2	281	987654					1610 FT	43 IN
The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.									

FAST ANALYSIS OF TAPE SURFACES DETAIL REPORT -- FATS VER 4.0 Z									
MESSAGE	ID	UCB	LABEL	OPTION	PASS	FILE NO	RECORDS	LOCATION	LENGTH
FATS107	TAPE1	280	123456					1 FT	01
FATS204	TAPE1	280	123456					1 FT	01
FATS204	TAPE1	280	123456					1 FT	02
FATS204	TAPE1	280	123456					1 FT	02
FATS204	TAPE1	280	123456					2375 FT	4 IN
FATS204	TAPE1	280	123456					2375 FT	8 IN
FATS204	TAPE1	280	123456					2376 FT	13 IN
FATS204	TAPE1	280	123456					2377 FT	10
This 13 inch ERROR is located at the end of the reel, by moving the tape's reflector strip back 3 feet this tape becomes a good tape.									

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NEWS

Users: Ada complex but has potential as writing tool



FIRST USER

It is complex, difficult to learn and still lacks some needed features, but it has good potential as a tool for writing portable, readable applications.

Those were among the comments of two early users of the Ada programming language that were interviewed recently by *Computerworld*. The users — BDM Corp. of Austin, Texas and Moog, Inc. of East Aurora, N.Y. — each have more than two years of practical experience with the Department of Defense-mandated language. Programming managers from the two companies generally agreed that Ada enforces clean and consistent programming and includes good features for high-volume, repetitive processing.

However, the managers also said that Ada programs written for their compilers tend to be resource-hungry and slow, especially during complicated processes. In addition, Ada's complexity also makes it a difficult language to master, they said, although modest proficiency can be achieved in just a few weeks.

BDM has been working on a defense-related application using the Rolm Corp./Data General Corp. Ada compiler for more than two years, according to Mike Perkins, vice-president of systems design and manager of the project.

The completed application, which Perkins would not describe in detail, will run between 30,000 and 40,000 lines of code. It involves heavy use of

interactive, high-resolution graphics and burst strengths of up to 400K bit/sec. About a dozen Ada programmers are involved in developing the program, which is in the detailed design stage, he said.

Ada valuable when reliability is a plus

Moog has completed three Ada applications on Intellimac, Inc. supermicrocomputers using an earlier, unvalidated version of a Telesoft, Inc. compiler. Moog, a maker of electro-mechanical actuators and electrohydraulic valves for high-precision motion control applications, has found Ada to be valuable for applications in which reliability is a plus, but has been disappointed in Ada's consumption of memory and CPU cycles, according to Terry Westley, software engineer.

Perkins said BDM has been proceeding slowly in the new language, largely because programmers have been learning on the job. He said Ada is three to four times as complex as Pascal and may take up to three times as long to learn. But he said Ada offers many more capabilities than most languages.

Ada not suited to small applications

Perkins said he has been surprised by the complexity of the language, particularly the procedures required to invoke a program. Because Ada was designed to be portable and because it can freely call other programs, as much as 70% of the code

can be taken up in setup commands. For that reason, he said Ada is not suited to small applications.

Ada specification manuals are massive, he commented. "You look at the [specification] and think it looks crazy, but when you look at the language you realize that you need the [specification]," he said.

Moog's Westley agreed that the sheer size of Ada makes it difficult to learn thoroughly, but he asserted that "you don't need a lot of training to begin using it. If you have some-

body who's familiar with Pascal, you can have him coding in two to four weeks," he said. Moog has given its five Ada programmers mostly on-the-job training, embellished by videotape courses from Alslys, Inc. of Waltham, Mass. Ada tends to enforce more structured design, although it does not inhibit creativity,

Perkins said. "It basically removes some of the uncertainty by forcing you to do things in a logical order," he said.

Westley agreed. "It's a modern language that uses modern techniques in structured programming and design," he said.

Because Ada imposes certain restraints, it lessens the chance of programming errors, he said. For example, a programmer cannot forget to end a subroutine with a RETURN command or write a routine that puts a floating-point number in an address space reserved for an integer.

Other Ada features can be used to

prevent common program bugs, Westley said. Exception handling flexibility allows program gremlins like "divide by zero" to be handled at various levels so that the program does not freeze. Loops can be exited at any time, a process that Westley said was more "intuitive" than those of standard languages.

However, Perkins noted that some common features are not yet available in validated Ada compilers. For example, BDM has had to write its own extensions to perform low-level bit manipulation and has designed some of its own logic functions that are still unavailable.

But Perkins said he expects the problems to be solved as the validation suite is expanded. "In the long term, Ada is going to be really slick, but now it's a little primitive," Perkins commented.

Ada is readable and maintainable

Both men praised Ada's readability and maintainability. "It can be more easily understood by people who didn't write it," Perkins said. Westley said one application Moog wrote in Ada has been running in the field without problems for more than a year.

But both also cited problems with the performance of Ada programs. For problems requiring extremely high-speed processing, such as closed-loop applications, Ada has proved to be too slow, Westley said. "We've been able to close loops in less than one millisecond," he said. "But when we've had other things going on [in the program], we have to get into the assembler."

Ada programs can consume up to five times as much memory as programs written in assembly, he said. "In our compiler there's a basic requirement of 32K [bytes] to do anything," he said. Other Moog applications written in Ada have required up to 400K bytes of memory.

Both Westley and Perkins commented that many of the problems they identified should be worked out in future compilers. "The kinds of problems we've seen are not inherent in Ada. We were just early in the technology," Westley said.

Ada handles nearly any need

Perkins sees potential in Ada for corporate applications but said that for the next year or two, any company that implements a project in Ada is taking some chances. "I can't see myself as an Ada zealot right now," he said. "But once things settle, it will be a real boon because you have the capability simply to update and recompile rather than rewrite completely," he said.

Westley, who has several years of Cobol programming experience, said Cobol has some significant advantages for business applications, particularly in report writing. But he said Ada is capable of handling nearly any need if the proper extensions are used.

"And having structured programming gives you huge advantages over Cobol," he said. Westley called portability a key. "I've gone through more than one conversion from one machine to another," he said. "If I had had Ada at the time, I wouldn't have had to pay my vendor \$50,000 to move my programs over for me."

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'[Ada] basically removes some of the uncertainty by forcing you to do things in a logical order.'

— Mike Perkins
BDM Corp.

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NEWS

IBM enhances DF software for MVS/XA environment

RYE BROOK, N.Y. — In conjunction with last week's introduction of two model types in the 3380 Dasd family (see story page 1), IBM also announced enhancements to programs in its Data Facility (DF) software series.

The enhanced programs are said to manage the flow of information in IBM's MVS/XA environment more efficiently.

These enhanced programs in the DF series are as follows:

■ **MVS/XA DF Product Version 2, Release 1** (MVS/XA DFP 2.1), said to support the new 3380 Extended Capability models and to provide virtual-storage constraint relief and additional device support for MVS/XA users. Features include increased available virtual storage below the 16M-byte line, enhanced Dasd space management in allocation and partial release and support for the IBM 3430 Magnetic Tape Subsystem and various

band printers. The program is scheduled to be available in the first quarter of 1986 for a monthly charge of \$900.

■ **DF Sort, Release 7 (Dfsort 7)**, which was designed to improve sorting performance on IBM 370-XA CPUs through the use of Sorting Assists, a set of processor instructions designed for the sorting algorithm used by Dfsort. Features include performance improvements in processor time, use of Sorting Assists in 370/XA-mode processors and 31-bit addressing in combination with IBM's VS Cobol II. Dfsort 7 is scheduled to be available this month for a monthly charge of \$231.

■ **DF Data Set Services Version 2, Release 1 (DFDSS 2.1)**, said to facilitate the copying of data between different types of storage devices to simplify conversion to the 3380 series storage devices. The program is useful in converting data sets from one Dasd type to another and in logical data-set

processing for dump, restore and copy. It offers Dasd space management enhancements that provide centralized storage management functions, including the release of allocated but unused space and the compression of partitioned data sets. DFDSS 2.1 is scheduled to be available in June for a monthly charge of \$215.

■ **DF Hierarchical Storage Manager Version 2 (DFHSM 2)**, which now supports the newly announced single- and double-capacity 3380 Dasds. Features include additional support for DFHSM primary, migration and backup volumes on IBM 3380 Extended Capability models. It is scheduled to be available this quarter for a monthly charge of \$600.

For more information, the National Accounts Division of IBM's Information Systems Group is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

Micropro halts copy protection for WP package

SAN RAFAEL, Calif. — Micropro International Corp. has suspended the use of copy protection for its new Wordstar 2000 and Wordstar 2000 Plus word processing packages for the IBM Personal Computer line. (A review of Wordstar 2000 by Yates Ventures, Inc. published in this issue on page 18 describes the copy-protection scheme Micropro dropped.)

"Although the copy protection we chose is the most technically advanced and the most transparent to the user, we believe it impedes the use of the product enough to warrant its suspension," said H. Glen Haney, Micropro president.

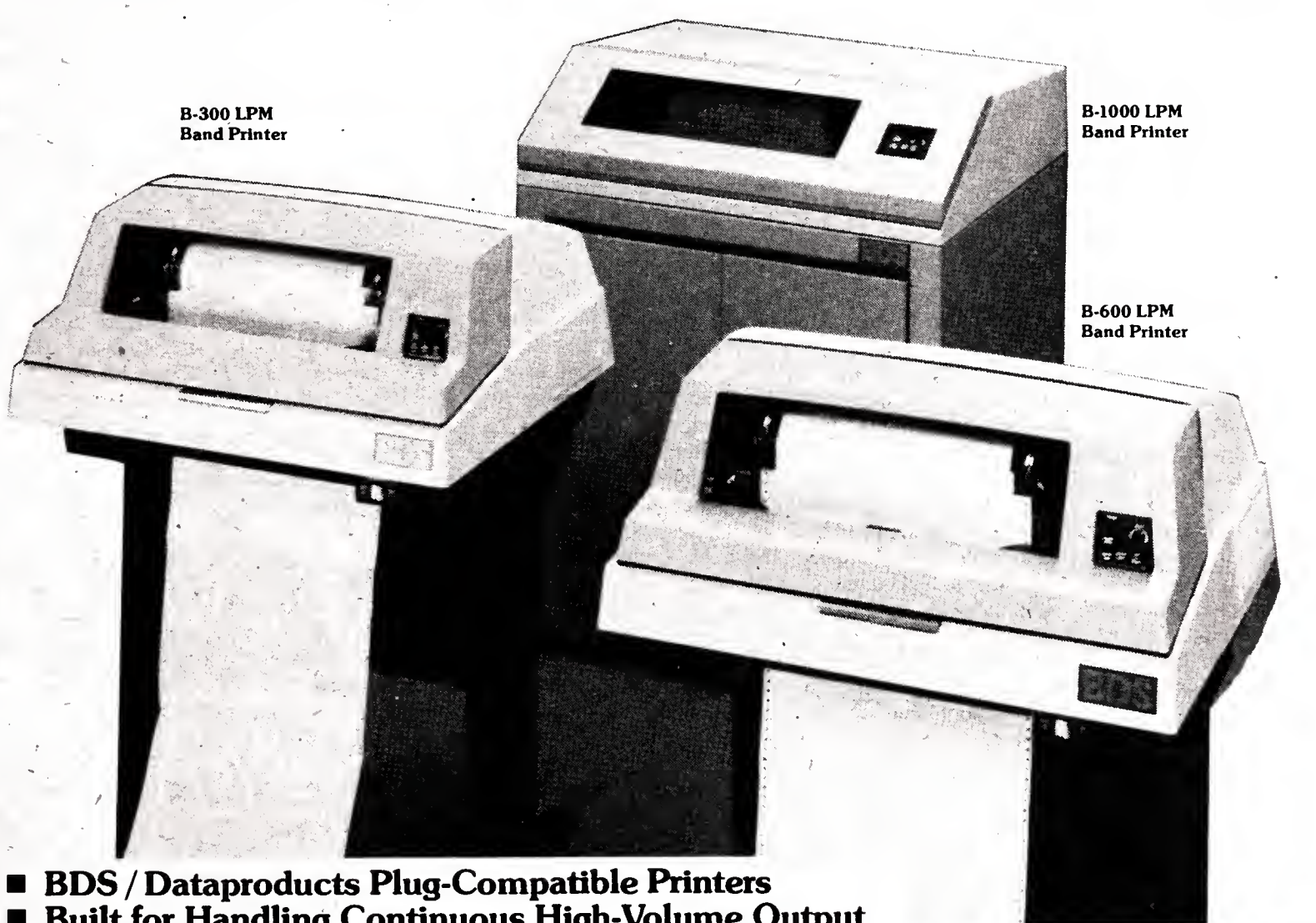
The removal of copy protection, effective Feb. 1, makes installation much easier and increases the number of Personal-Computer-compatible machines able to run the software, Micropro said. Update kits (with replacement diskettes, installation instructions and new labels) will be sent to all registered customers and to dealers who request them.

"Micropro continues to be vitally interested in protecting our products from illegal copying, but we are pursuing copyright enforcement through other channels," Haney said. In January, Micropro and the Association for Data Processing Service Organizations jointly sued American Brands, Inc. of New York and its Chicago-based subsidiary, Wilson Jones Co., alleging software piracy [CW, Jan. 21].

Wordstar 2000 was designed for the broad corporate market where ease of use and ease of learning are critical, according to Haney. The original Wordstar, which the company continues to sell and upgrade, is geared more toward technically oriented users, he said.

Industry observers noted that Multimate from Multimate International Corp. of East Hartford, Conn., which is generally seen as the leading word processing package in the large-corporation market, is not copy protected.

Wordstar 2000 and Wordstar 2000 Plus were introduced in October and shipped in December. They cost \$495 and \$595, respectively.



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NEWS

Phillips soothes micro phobia with hands-on program

By Maura McEnaney
CW Staff

BARTLESVILLE, Okla. — At Phillips Petroleum Co., evenings are a popular time of day. Groups of Phillips employees remain at the corporate headquarters four nights each week to get some hands-on experience with personal computers.

The company's Automated Information Management (AIM) program was launched last March at the suggestion of group vice-presidents on the company's data processing steering committee.

After management expressed interest in the program, company departments gave their input on the course structure, according to Raymond Stas, director of desktop computer support. Stas heads up the AIM program along with representatives from the company's User Computing Services and Office Systems divisions.

"We went to different parts of the company asking opinions on the types of things that should be highlighted in the seminar," he said. This "town meeting" approach also helped determine the amount of company-wide interest in the program, Stas said.

To stir up interest further, Stas and delegates from the two other group sponsors issued personal invitations to about 180 senior executives. "Then we let the program sell itself," Stas said.

Sales were exceptional, he said. Since March, Phillips has expanded the program — conducting two seminars a week. More than 963 of the company's 7,000 Bartlesville

employees have completed the two-day, eight-hour course. Another 900 employees are waiting to attend.

A class designed specifically for secretaries was added in August, and a class for engineers was added in October. Other classes are geared toward managers and business professionals.

According to Stas, approximately 20 employees attend each class, which is chaired by a representative from one of Phillips' sponsoring groups and taught by computer consultants from an Arthur Young & Co. office in nearby Tulsa, Okla.

The classroom is equipped with 20 IBM Personal Computers. Six hours of the program consist of hands-on training in spreadsheet, data base programs and word processing, Stas said. Each of the exercises used during the class is tailored to the student groups. Managers, for example, learn more spreadsheet applications, while engineers are taught to implement engineering-oriented calculations, Stas said.

In each class, the teachers assume that employees have no prior knowledge of the computer and begin the seminar with a tutorial on the keyboard. This was particularly interesting for the managers, Stas said. "The majority did not take typing in school," he explained. Nevertheless, he added, "I wouldn't say it was any harder or easier for them than it was for anyone in that age group."

To complement the seminar, Phillips established an AIM support center adjacent

to the classroom. Similar to a computer store, the center is open during business hours, stocking one of each of the standard products supported within the company.

Products stocked at the center include Hewlett-Packard Co.'s HP 150 desktop,

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The AIM program alleviated requests to information services for assistance with microcomputers.

IBM's Personal Computer AT and Personal Computer XT, Apple Computer, Inc.'s Lisa microcomputer, Compaq Computer Corp.'s Compaq computer and a Grid Systems Corp. Compass micro.

The center, staffed by seven employees reporting to Stas and five workers from the company's office systems group, also provides desktop

computer programs and tutorials that can be loaned.

Ted Lockin, manager of information services for the petroleum products group and a strong supporter of Phillips' AIM program, said, "It overcomes some of the initial inhibition that employees have about computers. . . . They can relate to what spreadsheet work can do [to assist] in their areas."

Locklin said that while his employees had little need for the computer course, others in the company had been helped. According to Lockin, the AIM program alleviated requests from other departments for assistance with microcomputers. With the new program, users can help each other, he said.

The support center has also proven valuable to his department in other ways. "If we need a word processing package, they can help us evaluate it," Lockin said.

But not all managers were as familiar with micros as Lockin. "I knew just enough to be dangerous," said Dean Lovendahl, a Phillips regional pipeline manager. Lovendahl, whose only use of a

personal computer was at home on his Commodore Business Machines, Inc. Commodore 64, took the AIM class last fall.

"I got an understanding of basic spreadsheet ideas and how they can be used to do things," he said. Although he has not added any desktop computers or programs to his department, Lovendahl said Aim "lowered the barriers on how to use them." Employees within Lovendahl's group have attended the class as well. "We've sent as many [workers] as they had classes available for."

Stas said he believes there is enough interest in the program to extend it into 1986. By that time, Phillips expects between 2,500 and 3,000 employees will have attended the course, meeting the steering committee's original goal of educating half the company in the use of personal computers. The company is also discussing the possibility of taking the course outside the Bartlesville headquarters to other Phillips offices, Stas said.

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NEWS

OAC showgoers question motives for Apple's absence



CW AT
OAC '85

By David Olmos
CW Staff

ATLANTA — There was a conspicuous absence last week as exhibitors hawked their wares at the Office Automation Conference (OAC) '85 here. Nowhere to be seen was Apple Computer, Inc., which two weeks earlier had unveiled the Macintosh Office, a laser printer and local-area network for the Macintosh micro-computer.

The decision by the Cupertino, Calif.-based firm not to attend OAC '85 left a lot of showgoers puzzled about Apple's strategy for the office market — an area considered crucial if Apple is to remain a major player in the personal computer market.

John Goetzman, office automation coordinator for Georgia Power Co. here, was one of those bewildered by Apple's absence. "[Apple] made a big [advertising] splash during the Super Bowl for the Macintosh Office. And

not to attend the conference as a lack of serious commitment to the office segment. Rather, he saw it simply as a marketing decision.

Apple had signed up as an exhibitor at the OAC but withdrew in December, according to Marty Byrne, conference marketing manager for the American Federation of Information Processing Societies, Inc., the show's sponsor. Apple did have an exhibit at last year's OAC in Los Angeles.

Barbara Krause, an Apple spokes-

"
'I think it's foolish of Apple not to take advantage [of this show].'

— Amy Wohl
Wohl Associates

woman, said the company chose not to attend because other projects, such as organizing a January annual meeting, took priority. "There is a limit to Apple's resources and our being able to pull something together in a short amount of time," she said. "We

want to make sure that the things we do are done extremely well."

Krause said that although OAC enjoys a good reputation as a trade show, "It just didn't seem to fit into our plan." She said Apple is becoming "very selective" in the shows it

attends, adding "We've said that our penetration into the business market will be a two-year window."

Some industry observers had urged Apple to attend OAC '85, according to Amy Wohl of Wohl Associates, a Bala Cynwyd, Pa., office automation consulting firm — and an admitted Apple fan. In remarks during a conference session here, Wohl stated that Apple has not yet learned how to market to large companies.

"I think it's foolish of Apple not to take advantage" of this show, Wohl noted. She said Apple does not seem to realize that most people who attend shows like OAC are not students or window-shoppers but rather "the people who sign purchase orders."

"

'[The Office Automation Conference] just didn't seem to fit into our plan.'

— Barbara Krause,
Apple Computer, Inc.

now here it is, the biggest OA show in the country, and it's not here."

Troy Leacock, manager of SCH Business Machines, a computer reseller in Grand Cayman, British West Indies, was one of several attendees who said they would like to have seen the Macintosh Office on display. "If Apple believed that strongly that they are a major contender in the office market, they should have made a serious effort to be here," he said.

Roger Levy, director of office automation for Richardson-Vicks, Inc. in Wilton, Conn., was skeptical about whether Apple is prepared for a major thrust into the office market, noting "I'm not sure it's ready to meet the needs of the office. But [the Macintosh] does have sex appeal." He said he did not view Apple's decision

"We had a thirty-day trial but twenty minutes made up our minds about Data Check Recovery."



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Institute offers certification

DES PLAINES, Ill. — The Institute for Certification of Computer Professionals has announced that its 1985 examinations will take place Saturday, May 11, and Saturday, Dec. 7. Application deadlines are April 6 for the May exam and Nov. 8 for the December exam.

The fee for the Certificate in Data Processing exam is \$140; for the Certificate in Computer Programming, \$105. More information is available from the institute at 2200 E. Devon Ave., Des Plaines, Ill. 60018.

NEWS

Speakers say plans, employee interest vital to OA



CW AT
OAC '85

By David Olmos
CW Staff

ATLANTA — Advance planning and employee involvement at all levels were two keys to successful imple-

mentation of office automation systems at two large companies and one small company, representatives from those firms said at a conference here last week.

At a session at the Office Automation Conference (OAC) '85 here, Kenneth Meyers of the American Express Co. in Plantation, Fla., Tom Eustice of Consolidated

Rail Corp. (Conrail) in Philadelphia and William Foulkes and M. Louise Parizek of the Bayvet division of Miles Laboratories, Inc. in Shawnee Mission, Kan., described their companies' strategies for successful installation of OA equipment.

American Express' travel-related services divisions embarked on an OA program

about 10 years ago when senior management decided that outmoded computer systems and too much paperwork were hampering the firm's operations, according to Meyers. The company initiated a program aimed at creating an on-line computer system, reducing paperwork and providing quick responses to customer inquiries.

Meyers said the problems the company faced could be divided into five areas: business requirements, computer systems testing, employee training, project planning and organization and bringing current and existing employees into the automated office.

At American Express, all the requirements for computer systems have to be approved in writing by the eventual end users of the equipment, Meyers said. He said the company found that "everyone, at all levels of management, needs to see, up front and personal, what the change looks like" well before it is implemented.

Meyers said the company created a separate department to oversee testing of large computer systems and that the department has helped speed automation at the firm.

In the organizational area, American Express found that when creating a new organization it is best to assign new duties to current employees gradually while they are still involved with their old jobs. This avoids creating employee fear and mistrust about new jobs, he said.

Since 1981, Meyers said, American Express has replaced the use of 10 million paper forms with on-line data entry. In addition, its systems have greatly reduced response time to customer inquiries and increased the accuracy of those responses, he said.

Conrail's OA efforts

Conrail's efforts in OA were driven by the company's unprofitable past and a directive to curtail costs sharply and increase efficiency, Eustice said. He listed six main points for a successful automation strategy: create a self-funding environment, emphasize long-range planning, stress change management, encourage user participation, solicit executive support and develop realistic expectations.

As a result of its automation efforts begun in the late 1970s, Eustice said the company achieved \$4.6 million in savings last year — mainly from reduced labor costs.

Bayvet, a \$70 million company that manufactures veterinarian supplies, began its automation efforts in 1980 with the goal of establishing an intelligent workstation environment for more efficient sales and marketing.

Acknowledging that the company made mistakes along the way, Foulkes said that the system has nevertheless paid for itself. Sales have increased 57% in four years while the number of clerical personnel has decreased 13%, he said.

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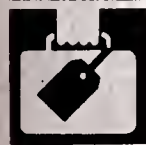
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NEWS

DG low-end mini, software debuts top OA show marquee

DEC adds VAX-based applications package



CW AT
OAC '85

By David Olmos
CW Staff

ATLANTA — Two major computer companies announced new and enhanced products here last week designed to bolster their positions in the office automation arena.

Data General Corp. took aim at IBM's System/36 minicomputer by unveiling a low-end addition to its 32-bit Eclipse minicomputer line, touting it as a processor for departmental and small business users.

The Westboro, Mass.-based manufacturer also announced a variety of integrated software products and enhancements to current offerings designed to link its products together while coexisting with IBM mainframes.

Another major player in the office automation market, Digital Equipment Corp., introduced a line of applications software for sales and marketing departments based on its All-In-One Office and Information System, which is based on the VAX series of superminicomputers. The Maynard, Mass., firm also announced an applications integration kit said to allow DEC, its customers and third-party software suppliers to integrate business applications with the All-In-One system.

Few major product introductions

The announcements came at the American Federation of Information Processing Societies-sponsored Office Automation Conference '85 here, an event most observers agreed was largely bereft of major product introductions.

The new DG processor, the MV/4000 Departmental Cluster (DC), is said to include increased expansion capability, twice the memory and three times the disk capacity of its predecessor, the Eclipse MV/4000 SC. It can support up to 16 users, depending on the application, and up to four synchronous communications lines, the vendor said. It is available with 1.5M-byte diskette storage and a 15M-byte cartridge tape drive. It is also said to offer a link to the Xerox Corp. Ethernet-type IEEE 802.3 local-area network.

According to the vendor, the MV/4000 DC can run the firm's Comprehensive Electronic Office (CEO) integrated software, system and communications software and programming languages, as well as a variety of operating systems. The MV/4000 DC also includes the X.25-based Network Management System, communications products such as Systems Network Architecture (SNA), several emulation packages, the Infos file management and Present W/DG DBMS data base management system products, high-level languages and programming utilities and CEO software.

A typical system with the processor, 3M-byte main memory, 14 workstations, a Xerox Ethernet transceiver

and cable, 120M-byte disk drive, a diskette drive and two letter-quality printers costs \$79,500, the vendor said. Deliveries will be made 30 days after order date, the vendor said.

First product of cooperative agreement

Topping DG's software announcements was the AOS/VS Decision Link package, which is said to enable users to directly access data in IBM mainframes from DG's CEO system. The package is the first product of a 1984 cooperative agreement between DG and Cullinet Software, Inc., connecting CEO with Cullinet's Information Data Base software via an SNA communications link.

AOS/VS Decision Link operates on

the Eclipse MV series running DG's AOS operating system. DG said the software will be available in six months and will cost \$5,000 for an initial license and \$4,500 for a subsequent license.

Other software-related announcements by DG included the following:

- Two integrated graphics packages for the CEO system, CEO Drawing Board and CEO Wordview, each priced at \$2,500.

- An expanded version of the vendor's Trendview graphics package, priced at \$3,150.

- DG/Gate, a software enhancement for DG's terminal emulator said to give users access to Mead Data Corp.'s Lexis and Westlaw Services,

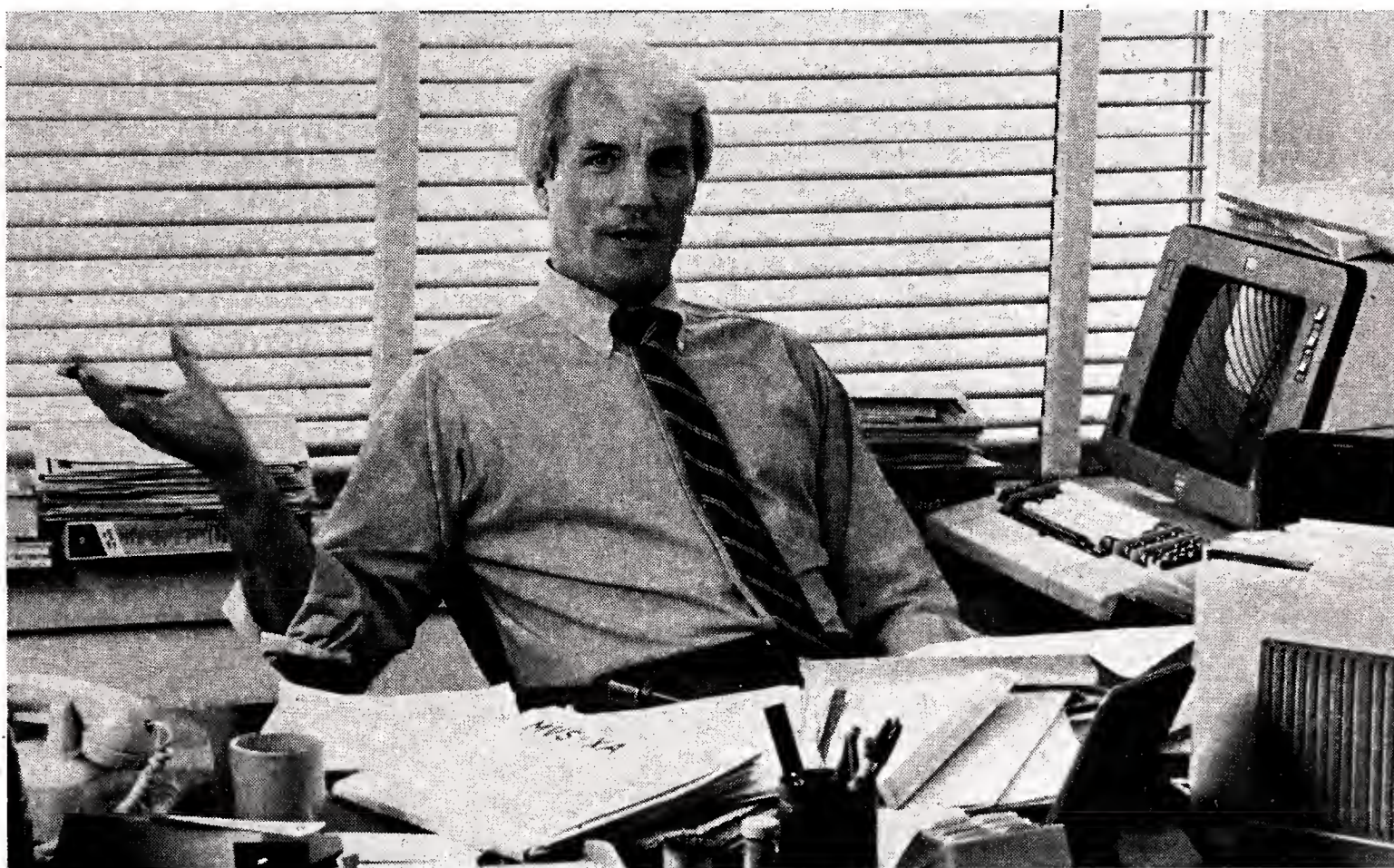
Inc.'s Westlaw legal data bases. DG/Gate prices start at \$1,000.

- An extension of a communications package, CEO Connection, said to enable IBM Personal Computer and DG Data General/One users to access CEO. The package reportedly provides document conversion capabilities between Microsoft Corp.'s MS-DOS operating system and CEO software programs. Package prices are \$295 for the DG/One and \$395 for the Personal Computer.

- A software package, CEO Document Exchange V, said to provide an interface between DG's CEO and a disk conversion product made by Altertext, Inc. The first license price for

See **DEBUTS** page 14

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NEWS

Cross-checking leads to indictment of 76

By Charles Babcock
CW New York Bureau

TRENTON, N.J. — Computer cross-checking has led to the indictment of 76 people for unemployment benefit fraud and has uncovered an additional \$1 million per month in excess payments, the New Jersey Attorney General's office said recently. The fraudulent claims ranged from \$1,078 to \$9,213 per person and totaled \$262,000.

Although cross-checking has been used twice before within the state, the 76 indictments were New Jersey's first major crackdown on fraud in the system, Richard T. Carley, deputy attorney general, said. In addition, the cross-checking has unveiled 35,000 cases per year of mistaken claims and excessive payments that are being handled on a noncriminal basis. Those cases represent a potential \$1 million per month in refunds to the state; the system will save about \$550,000 to \$600,000, said Gerald M. Kelly, supervisor of investigations for the New Jersey Labor Department.

The cross-checking was made possible through a \$6 million development effort to rewrite the state labor department's unemployment insurance system software. The project was split between an in-house staff and an independent contractor. Approximately 48 state programmers, systems analysts and data base technicians worked on the new system for the equivalent of a year, said Edward J. Mount, a manager in the Office of Telecommunications and Information Systems.

The system runs under CICS on an IBM 3081 Model J here. It governs 220,000 daily transactions disbursing a total of \$4 million per day at 40 sites around the state, Mount said.

The large payback yielded by the system has surprised state administrators, Mount added. There are 900,000 recipients of unemployment benefits per year in New Jersey, and it was not possible to double-check each application manually. "The tracking and paperwork were overwhelming," he noted.



WASHINGTON
UPDATE
Mitch Betts
CW Washington Correspondent

Reagan proposal calls for 21% SSA staff reduction by 1990

WASHINGTON, D.C. — The Reagan administration last week said it plans to reduce the staff of the Social Security Administration (SSA) 21% by 1990, and part of that reduction would result from SSA's \$500 million computer systems modernization program. Members of Congress and SSA managers have denounced the proposed staff cuts.

About 17,000 SSA jobs will be phased out, 4,500 of them directly attributed to the new computer systems, congressional aides said. Low-level jobs handling paper forms, microfilm and magnetic tapes will be replaced by automation and new magnetic disk storage systems, an aide said.

At a recent press conference, the Social Security Management Association, a group of SSA supervisors and several members of Congress said the proposed staff reductions would result in less-effective service to Social Security recipients. The legislators included Rep. Edward R. Roybal (D-Calif.), chairman of the House Select Committee on Aging and members of the Maryland delegation seeking to protect the jobs of constituents at the SSA headquarters in Woodlawn, Md.

The U.S. Department of Health and Human Services, in its Feb. 4 budget proposal, said a "six-year staffing reduction plan" will provide for retraining and relocation of employees. By 1990, the staff will be scaled down to 62,945 full-time employees, a reduction of

17,006, the budget document said.

Commerce Department extends export regulation grace period

WASHINGTON, D.C. — The U.S. Commerce Department recently announced that the grace period for implementing new export regulations will be extended 90 days, until April 29, to give the computer industry time to adjust to the new rules.

The extension allows time for U.S. high-technology firms to clarify definitions and procedures, according to Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association.

"There are currently a number of unanswered questions," he said. The new regulations govern the export of certain computer and software products as part of an effort to inhibit the acquisition of technology by Soviet bloc countries [CW; Jan. 14]. Henriques said the computer industry was "surprised by the extent of the new trade regulations. We're still examining the impact on our industry and welcome the grace period as a time to clarify ground rules and criteria."

For example, Henriques said, questions need to be resolved about the regulatory treatment of embedded microprocessors and software.

"Under the new regulations, embedded microprocessors fall into different categories depending on their power and the extent to which they are integrated into the product. We're not at all sure precisely where the cut-offs occur," he said.

Similarly, the new regulations control software sales to U.S. allies but lack clear definitions of what software is covered by the rules, he said.

DEBUTS from page 13

CEO Document Exchange V is \$5,000.

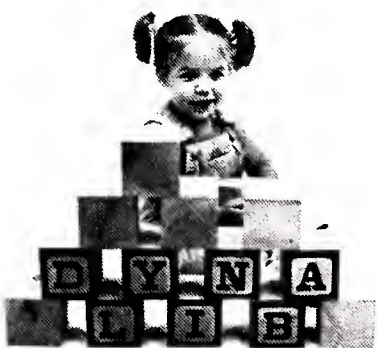
■ A letter-quality printer, the Model 6321, for the CEO system, priced at \$2,695.

The DEC announcements included an All-In-One applications integration kit for DEC's All-In-One Integration Standard.

Additionally, DEC announced a joint marketing agreement with Ross Systems, Inc., whereby Ross will use the All-In-One Integration Standard and kit to integrate its applications with the All-in-One system.

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NEWS

Airline systems holding up in spite of business boom

By Maura McEnaney
CW Staff

DALLAS — When American Airlines, Inc. announced its Ultimate Supersaver fare in mid-January, its phones began ringing off the hook.

The fare reduction, which American said has reduced prices up to 70% in some cases, boosted sales significantly, the airline claimed, but has not put any strain on the airline reservation system.

According to James Marston, vice-president of data processing and communication services, American is handling a "fairly sizable load" of traffic with the fare decreases, but claimed, "We have not broken any records."

Passenger volume

Despite the new fares and renewed interest in air travel, passenger volume has not surpassed holiday levels, Marston said.

In computer terms, airline volume is based on a message/sec basis. Each message represents a computer transaction. Booking a reservation represents one message; automatic ticketing represents another, he explained.

American's reservation system consists of four IBM 9083 mainframes running consecutively. The 9083 is a faster version of the 3083 Model J designed specifically for airline applications. During the past holiday season, the system handled more than 1,000 messages/sec, Marston said. With today's reduced fares, the system is handling about 950 messages/sec, according to Marston.

Keeping tabs on success

Although the computer system appears to be holding up well, the Supersaver program and the resulting flood of passenger traffic means keeping careful tabs on the program's success. To do so, American is writing new software applications to produce visual displays and printed reports tracking American flights, Marston said.

Other reports will detail booking figures, airline rates and the number of occupied seats per flight, he said.

Not to be outdone, competing airlines responded quickly to American's fare change, matching the price cuts dollar for dollar.

At United Airlines, Inc., an announcement similar to that of American's Supersaver fares brought in passenger traffic usually seen only during the holiday season.

"This year's fare announcement equates to what we would have expected to see in November," said Lyle

Hobbs, director of United's Apollo reservation system.

Apollo's message volume peaked at about 700 to 750 messages/sec on the Friday following United's fare decrease announcement, Hobbs said.

According to Don Karmazan, United's vice-president of computer and communications services, the Apollo res-

ervation system consists of five IBM 9083 mainframes in a loosely coupled environment.

The data base runs IBM's Transaction Processing Facility (TPF) Version 2 and is connected to 300,000 miles of leased data circuits. Apollo is accessed by 50,000 terminals, 30,000 of which are in travel agencies located

across the country.

Those machines provided "adequate capacity, and we have been able to accommodate the volume without experiencing a slowdown or stability problems with the machine," Hobbs said.

Being able to handle the traffic, however, meant some advance planning. As part of a two-year planning process,

United upgraded its IBM 3350 disk drives last summer, bringing in 340 modules of the IBM 3380 storage devices.

The addition of TPF Version 2 permits system expandability, and other software enhancements allow United to keep up with quickly changing prices, Karmazan said.

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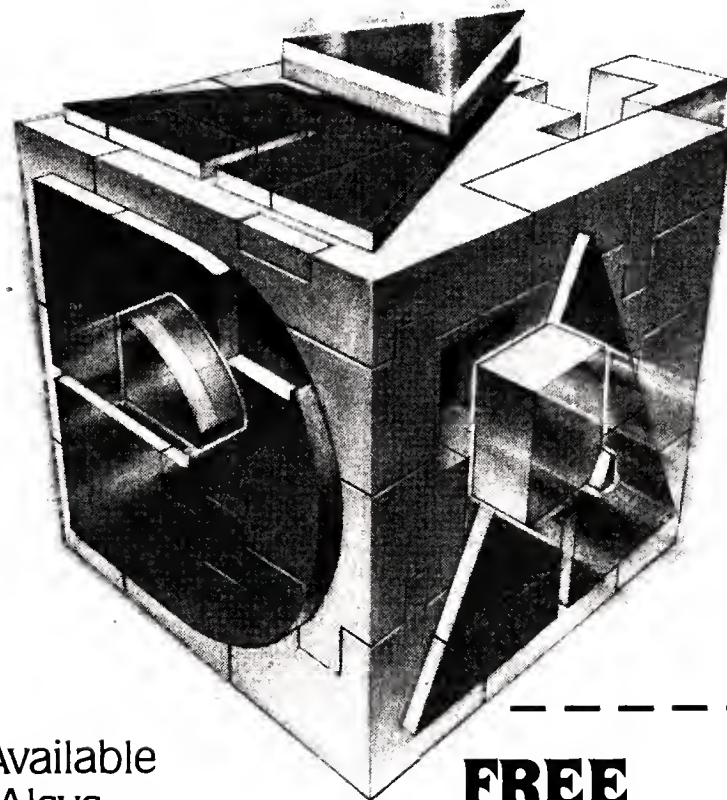
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NEWS

Banks take interest in real-time on-line processing



CW AT ABA

By Bryan Wilkins
CW Washington Bureau

NEW ORLEANS — On-line real-time entries for debits and credits in personal bank accounts are becoming necessities in the banking industry, and telecommunications will make it possible.

At an American Bankers Association (ABA) conference on telecommunications and financial networks here last week, James Hopes, vice-president at Chase Manhattan Bank,

said that the traditional 24-hour batch-processing method of handling money transfers is fast becoming a liability for a bank's competitive position.

Hopes said that the use of automated clearinghouses (ACH), where banks form a network to credit and debit accounts, will likely be the means by which same-day settlements take place.

The National Automated Clearing House Association (Nacha) recommended that banks wanting to erect an ACH within their region follow a set of guidelines outlined by the group. Last year, Nacha selected General Electric Information Services Co. (Geisco) to be the provider

of ACH services.

However, several bankers expressed alarm that with the fast-changing climate in financial services, Geisco might turn out to be their competitor. Hopes admitted it would be better for Chase Manhattan if Geisco had competition. Nacha selected Geisco over the McDonnell Douglas Automation Co.'s Tymshare division acquired last year.

Hopes said the batch processing used by banks for money transfers took several days to complete and offered banks "float" or free use of the money. Telecommunications networks in the ACH system are making this procedure obsolete because the networks make transactions cheaper.

"The difference between money transfers vs. ACH today is between pennies — a cent and a half for an ACH transaction — and dollars for a Fed Wire transfer," Hopes said. (Fed Wire is the federal wire system of the Federal Reserve Bank.)

A Geisco representative said its research showed that ACH use is expected to grow 15% annually over the next few years and that the dollar value of transactions is expected to jump 80%.

Authentication problem

The transition to on-line real-time settlements on the same day of payment between banks will enable bank customers to have faster use of cash. There are, however, problems facing ACH and telecommunications/automation of bank processing. The major fear is authentication of transactions. "How do you know that the person authorizing a payment transfer on the other end is actually the right person or organization that is supposed to receive it?" Hopes asked.

The security concern is expected to become a major drawback to bank participation in ACH use, especially as dollar amounts grow in electronic funds transfers. "I expect that the banks and other institutions will mandate that authentication be built into the payments systems to handle the risks," Hopes predicted.

Currently, however, an ACH payment message is limited in length to 94 characters. Nacha has not moved to embrace the standards for formatting payment mechanisms that have been adopted by Bank Wire, Swift, Electronic Data Interchange and other organizations that specialize in money transfer systems.

Although acceptance of faster settlements presents banks with a challenge, it is acknowledged that their customers are demanding quicker access to their cash, pushing the formerly staid institutions to adopt automation strategies. "The corporations want their dollars faster. Availability is important," Hopes said.

AMA seminars to help buyers

SARANAC LAKE, N.Y. — American Management Association (AMA) has announced a series of seminars on using electronic DP as a tool to improve purchasing operations.

Classes will be held March 4-6 at the Sheraton Boston Hotel; March 25-27 at the AMA Management Center in Washington, D.C.; April 1-3 at the AMA Management Center in Chicago; May 22-24 in New York; June 3-5 in San Francisco; and June 10-12 in Atlanta.

The seminars will focus on how the computer can be used to help buyers control the daily work flow, to provide tools and standards of performance for the department manager, to spot volume contract opportunities and to manage inventory.

Individual fees are \$695 for AMA members and \$795 for nonmembers. Discounts are available for groups.

The AMA can be reached at P.O. Box 319, Saranac Lake, N.Y. 12983.

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Our highly optimized file and screen I/O means your programs load faster and your screens come up faster. And the C-ISAM™ really speeds indexed file handling. These things make a real difference for interactive COBOL applications that concentrate on manipulating data and handling files.

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*Enhanced Technology is the term Micro Focus uses to describe a set of features representing a major evolution of its underlying technology. The enhancements include: extended data and code addressing (256 Megabytes data, 800 Megabytes code); multiple dynamic memory areas available to the programmer (like multiple heaps); shared text for intermediate code and generated native code programs; greatly improved execution speed through Abstract Machine extensions; greatly optimized Native Code Generation.

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MICRO FOCUS

NEWS

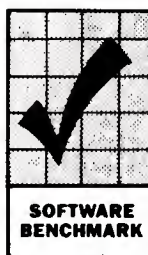
MODULE COMPARISON
WORDSTAR vs. WORDSTAR 2000

	Wordstar	Wordstar 2000
Context-sensitive onscreen help		Yes
Saves formats with document		Yes
Automatic paragraph reform		Yes
GOTOPAGE command		Yes
Double spacing displayed onscreen	Yes	
Underscore and boldface onscreen		Yes
Undo last command		Yes
Saved glossary feature		Yes
Columnar math operations		Yes
Automatic footnoting		Yes
Mail merge	Yes*	Yes
Alphanumeric sorting		Yes
Windows between documents		Yes
Spelling correction	Yes*	Yes
Proportional spacing		Yes
Background printing		Yes
Automatic indexing	Yes*	Yes
Automatic table of contents	Yes*	Yes

* These features are available for Wordstar as separate stand-alone programs from Micropro International Corp.

Wordstar 2000: Easier to use?

Micropro's enhanced WP tool enters arena in full swing



Waiting until the hubbub over new integrated products had died down a bit in the last quarter of 1984, Micropro International Corp. announced a completely redesigned word processing system, Wordstar 2000, on Oct. 31.

Reflecting IBM's dominance of the personal computer market, Wordstar 2000 in its current version supports only IBM's Personal Computer and full compatibles as well as the new Personal Computer AT.

As Lotus Development Corp. has become almost synonymous with electronic spreadsheets in the user's mind, so Micropro is associated with word processing. And rightly so, since Wordstar, with a base of 1 1/4 million registered users and a host of mimicking competitors, can be said to have set the standard in powerful business word processors for the personal computer. And it is only Micropro that seems likely to challenge its own standard successfully with the release of Wordstar 2000.

Wordstar 2000, Micropro claimed, is a system that does not demand the traditional trade-off between power and ease of use. The company also touted Wordstar 2000's user friendliness.

With all of this in mind, the Yates Laboratory subjected both Wordstar 2000 and the original Wordstar to a full set of word processing tests. Part of the results of the Yates comparison study are shown in the accompanying charts and in the textual analysis and conclusions that follow.

The biggest difference in installation between the two Wordstar programs is that Wordstar 2000 is copy-protected, a feature totally absent in the original. While a maximum of only three copies are allowed, the installation program does provide an "uninstall" utility that, in essence, resets its counter mechanism. This makes it possible to recopy the program to new diskette media or to remove it from a hard disk for later installation without affecting the number of copies used.

Supports DOS tree structure

The hard-disk installation program supports the tree structure of DOS 2.0 and 3.0 by automatically creating a directory for Wordstar as well as copying the batch file in the root directory during the installation sequence. This makes it possible for a user to access Wordstar 2000 even if he is not currently in the Wordstar 2000 WS2 directory. Wordstar 2000 also supports full path names as part of the document file name, an unusual feature even for word processors designed for use under DOS 2.0.

Wordstar's command structure was set up primarily with the touch-typist in mind. The transition from the typewriter to computer keyboard was made as easy as possible for the user by restricting commands to the use of the Qwerty letter keys in various combinations with the control key.

Along with making it easier for the trained typist to manipulate all program functions as well as text entry from within the familiar confines of the keyboard, Wordstar also had the added benefit of supporting a multitude of terminal types, some of which offered only a control key along with standard Qwerty arrangement.

The word processing commands were not, however, assigned according to a strict system of mnemonic associations between the function name and letter combination used, which contributed significantly to Wordstar's reputation of being difficult to learn. They were, rather, set up to maximize keyboarding efficiency, an ergonomic approach primarily benefiting the touch-typist. Therefore, Wordstar conferred the mixed blessing of being rather hard to learn but easy to use, if that use were fairly heavy and not intermittent.

Wordstar 2000 reversed the design priorities by choosing a strict mnemonic command system for its basic structure. The third chart compares samples of often-used editing commands that typify the differences

in command design.

Correlation between letter keys and functions

As with Wordstar, the 2000 system also uses the control key, symbolized by the caret, in combination with letter keys. However, all letter selections now correlate directly with functional names, which has the effect of reducing a new user's initial learning time substantially. Once the user has kept the basic associations in mind, like "Q" for Quit, "L" for Locate, and "R" for Remove, all the finer distinctions such as "QC" for Quit and Continue and "RW" for Remove Word fall quickly into place.

This associative process is also accelerated with the availability of context-sensitive on-line Help, whereby the user can always call for an explanation of a command should the mnemonic link fail to be obvious.

Wordstar 2000 is not, however, limited to this command system. For those users more comfortable with the function key command access utilized by dedicated

word processors, the program provides an interface similar to that used by Multimate International Corp.'s Multimate. Prominent file commands are accessed by using the top row keys (1 to 0, hyphen and equal keys) in combination with the alternate key.

In addition, most command editing and formatting commands are invoked using the 10 function keys either individually or with the standard shift key. It is also possible to reconfigure the functions of these keys using the installation program.

As is common with many of the word processors for the IBM Personal Computer, a plastic keyboard overlay illustrating key and function correlation is included for quick reference.

Micropro has attended to almost all the missing features for which Wordstar was criticized by including them in the Wordstar 2000 system. The first chart indicates the notable differences in features between the two.

Saved document formats

In terms of editing, the biggest change is Wordstar 2000's use of saved document formats. With Wordstar 2000, the user must choose a predefined document format or customize one prior to creating a document.

Wordstar 2000 comes with five such predefined formats as well as an unformatted template to be used with data files or documents in straight Ascii format. Each format saves information on the margins, tab settings, line spacing, character pitch, the type of right margin and paper size as well as the format commands that determine the printed page layout. Gone is the system of dot commands made famous with Wordstar and gone is the need for the user to set up margins that differ from the default settings each time the document is edited.

While initial set-ups do take some time, thought and planning, they save time in the long run. This system is sure to be seen as a marked improvement over Wordstar, especially in business, where standard document types and formats are used over and over again.

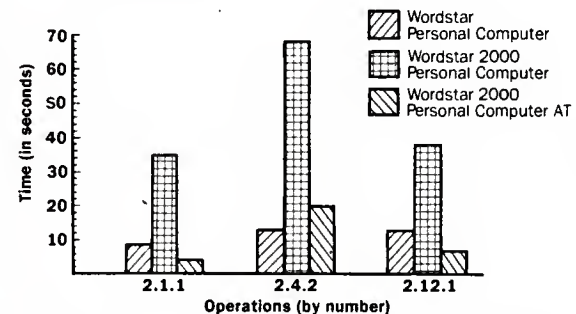
Proportional spacing available

When it comes to printing, the major difference is Wordstar 2000's ability to perform proportional spacing as well as support background printing. Invoking proportional spacing is a painless process of selecting

See **WORDSTAR** page 22

PERFORMANCE TEST RESULTS (All times approximate and machine-specific)

No.	Operation	Wordstar Personal Computer	Wordstar 2000 Personal Computer	Wordstar 2000 Personal Computer AT
2.1.1	Load program in RAM	9 sec	35 sec	4 sec
2.4.2	Global search and replace — backwards, onscreen without approval — 16 occurrences	13 sec	68 sec	20 sec
2.12.1	Save edited 10-page document file to disk	13 sec	38 sec	7 sec



COMMONLY USED WORD-PROCESSING COMMANDS WORDSTAR'S ERGONOMIC vs. WORDSTAR 2000's MNEMONIC SYSTEM

Description of Command	Wordstar Command	Wordstar 2000 Command & Mnemonic Meaning
Delete word	^T	^RW (Remove Word)
Delete line	^Y	^RE (Remove Entire line)
Delete block	^KY	^RB (Remove Block)
Search	^QF	^L (Locate text)
Search and replace	^QA	^L (same as above using different options)
Save and resume	^KS	^QC (Quit and Continue)
Save and quit	^KD	^QS (Quit and Save)
Quit and abandon	^KQ	^QA (Quit and Abandon)

WORDSTAR 2000 SYSTEM REQUIREMENTS

System Configurations

IBM Personal Computer and compatibles (except AT&T 6300); Personal Computer XT; Personal Computer AT

System Requirements

Personal Computer, compatibles; MS-DOS 2.0, 2.1;
Personal Computer XT 256K RAM; 2 disk drives
Personal Computer AT PC-DOS 3.0;
320K RAM; hard disk

Installation/Start-Up Procedures

Program copy protected	Yes
Maximum number of copies allowed	3
Hard disk installation	Yes
Boot from hard disk	Yes
User level required for installation	Novice

Micropro International Corp. Company Profile

Founded in 1978, Micropro International is a supplier of microcomputer applications software. Although the company markets a full line of products, it is best known for its Wordstar word processing program, which has been translated into nine languages. Headquartered in San Rafael, Calif., Micropro has 10 field sales offices in North America and subsidiaries in Europe and Japan. More information is available from Micropro, 33 San Pablo Ave., San Rafael, Calif. 94903.

ABOUT THE BENCHMARK

Product evaluations, specifications and technical information are provided by Yates Ventures, Inc. Software Evaluation Laboratory Service (Sels), which is solely responsible for their accuracy. More information about Sels is available from Yates Ventures, Suite 201, 3350 W. Bayshore Road, Palo Alto, Calif. 94303.

NEWS

DP execs split on issue of VDT-related health hazards

By Edward Warner
CW Staff

PARK RIDGE, Ill. — A full third of the 230 corporate data processing managers responding to a recent Data Processing Management Association (DPMA) survey said computer terminals pose a health hazard to users.

Data processing managers contacted by *Computerworld* for response, however, all said they disagreed.

The survey, conducted in December and reported in the January/February issue of the DPMA's "Comp-U-Fax" newsletter, also found that 84% of the respondents worked in organizations that had no guidelines on ergonomics in their corporate policies.

One 'broadly stated' question

According to "Comp-U-Fax" editor Austin Weber, the survey, an eight-question questionnaire mailed to 1,000 DPMA members, asked only one "broadly stated" question about whether the DP managers felt terminals presented a health hazard. The question, he acknowledged, could have encompassed concern about backaches and eyestrain as well as hazards with longer term effects.

The respondents in the DPMA survey singled out the terminal as the most important point where ergonomic changes were needed, Weber noted. Among the changes respondents called for were use of removable keyboards and the adoption of tilt-and-swivel, nonglare VDTs with

amber screens, he said.

The survey's respondents consisted of a random sampling of corporate data processing managers chosen from the DPMA's 48,000-member roster. Among the survey's other findings were the following:

- Sixty-seven percent of the respondents believed their end users were concerned about computer ergonomics.

- Ninety-one percent of the respondents believed ergonomics deserved greater corporate recognition.

- About 35% noted they would like greater support from top management to purchase ergonomically designed chairs and workstations.

Those DP managers called by *Com-*

puterworld for comment, meanwhile, all said they did not feel terminals were a health hazard. All also worked in organizations with no formal policy on ergonomics.

At AMF, Inc. in White Plains, N.Y., Bradley E. Hosmer, corporate vice-president for group services and MIS, said, "My position is that I don't think they're a health hazard. I personally don't see any ill effects [suffered by] people who use word processors or terminals heavily." AMF considers the comfort of terminal users a matter of individual needs, he added.

No worse than TV sets

Joel Abramowitz, MIS manager at

U.S. Trust Corp., in New York said, "I don't think [they're] worse than anything else, [such as] microwave ovens or TV sets."

The director of New York City's Computer Service Center, deputy commissioner Joe Giannotti, said the users of the city's roughly 1,200 terminals have complained of nothing more than eyestrain. The "only complaint I've heard about terminals is [that] there are not enough of them," he added.

A lighter comment came from John Cronin, controller in corporate information services at Pfizer, Inc. in New York, who said terminals are [not a] health hazard "unless you drop one on your head."

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*National Institute For Occupational Safety and Health Study, August 1981.

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Implementing Ada seminars set for March

TORRANCE, Calif. — The Education Foundation of the Data Processing Management Association (DPMA) is sponsoring a series of seminars in Atlantic City, Washington, D.C., and Boston on implementing the Ada language.

The sessions, titled "Implementing Ada," will focus on the development of a phased Ada technology transfer and training corporate program and will include topics such as coping with the technical risks for real-time, embedded system development; compiler and environment development; lessons learned from early implementation efforts; designing and coding in Ada; and Ada program status.

The seminars will be presented by John T. Foreman, manager of the Ada Technology Branch at Texas Instruments, Inc.

The sessions will be held March 4-5 in Atlantic City, March 11-12 in Washington, D.C., and March 21-22 in Boston.

The registration fee is \$525. Discounts for DPMA members and team registrations for university and government personnel are available.

The seminars are being managed by Technology Training Corp.

Information on the seminars may be obtained from Education Foundation DPMA Seminars, Technology Training, Department Ada, P.O. Box 3608, Torrance, Calif. 90510.

COMPUTER FAT.

HOW TO AVOID IT, FROM THE LEADER
IN ON-LINE TRANSACTION PROCESSING.

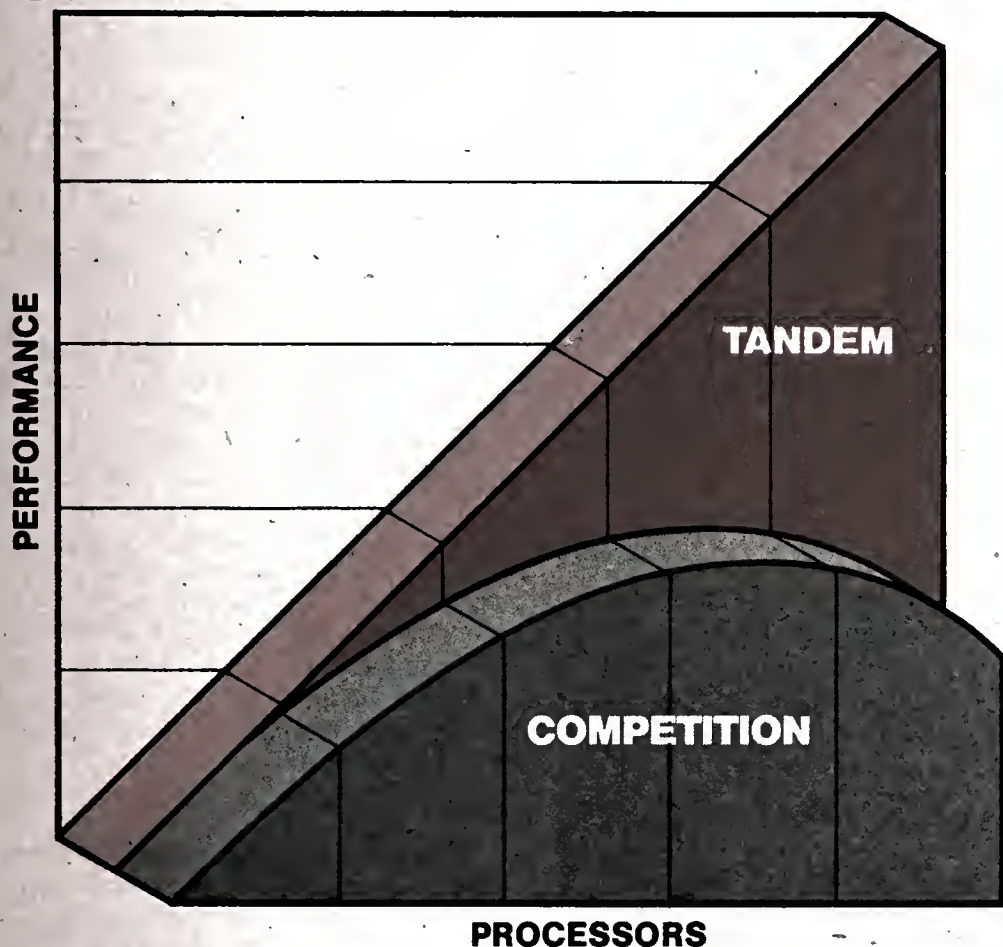
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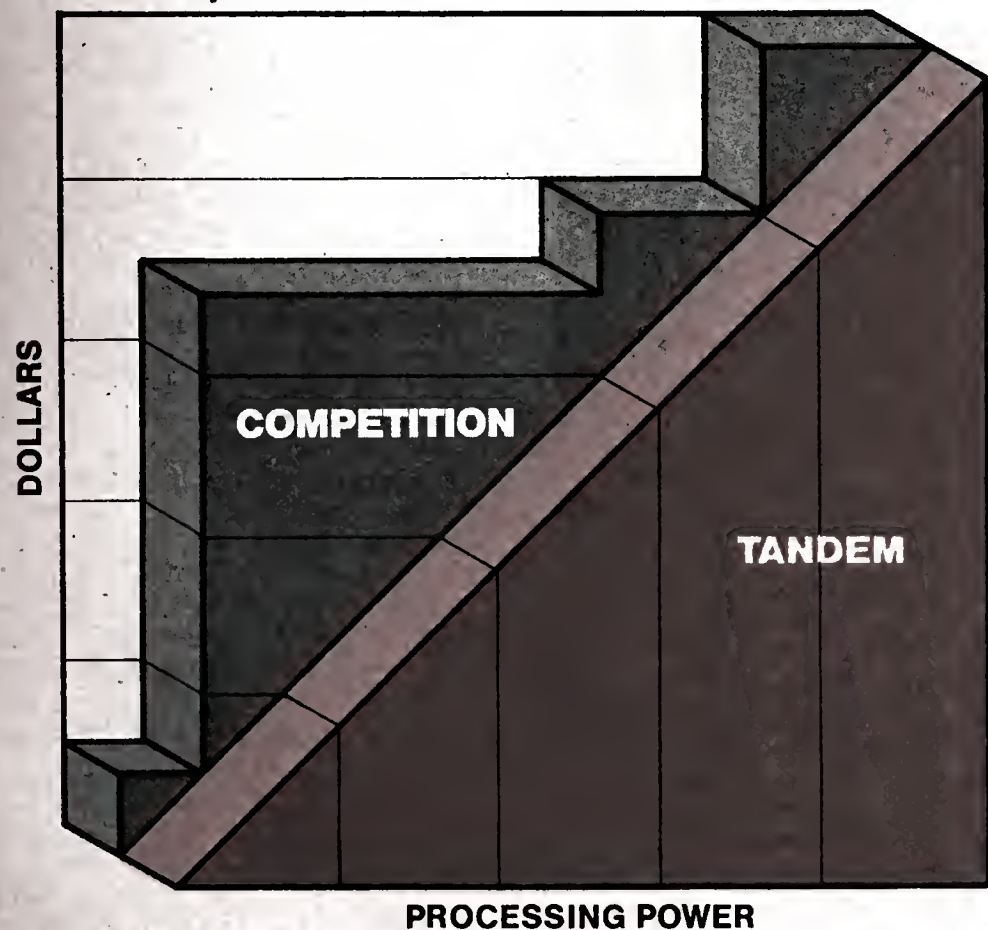
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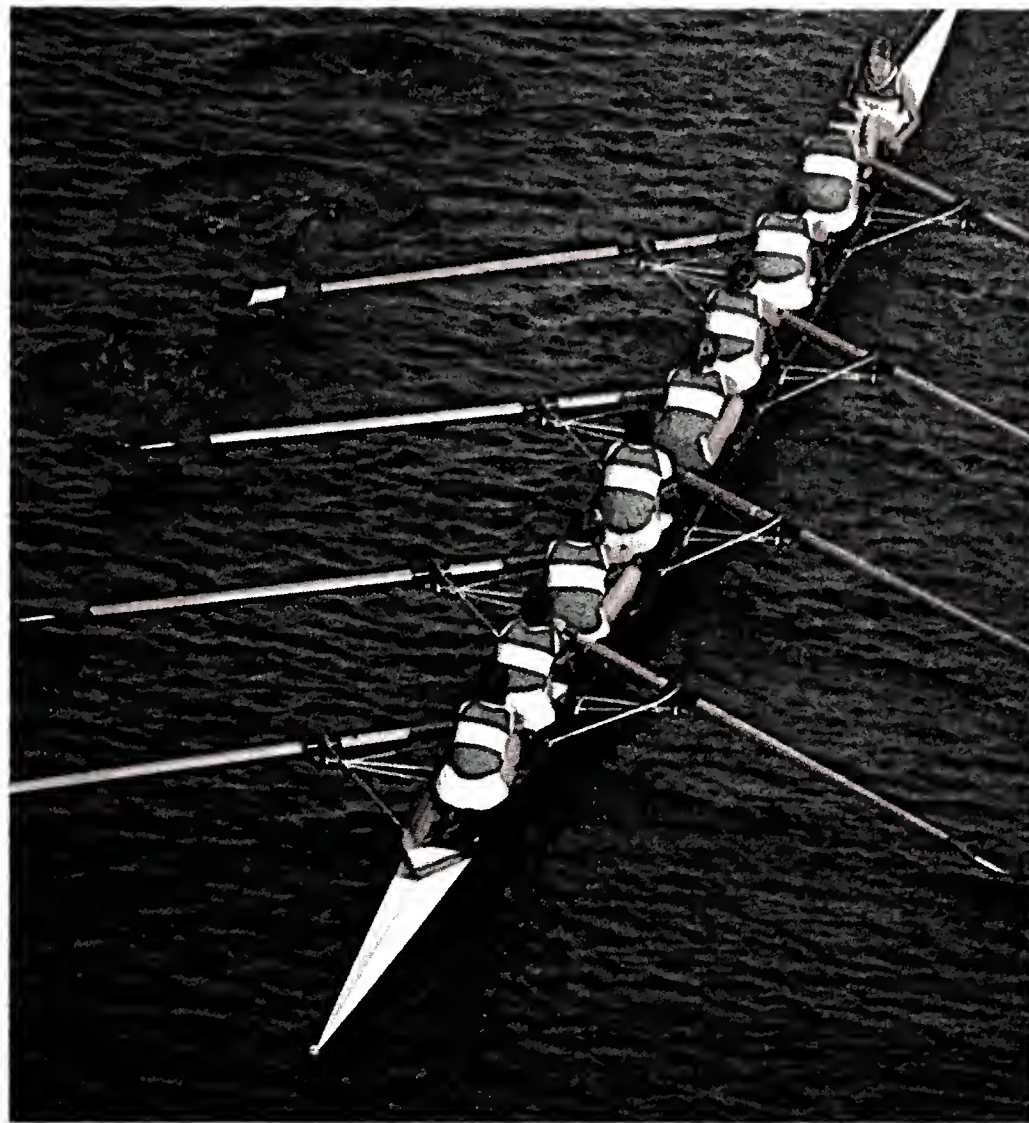
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 **TANDEM COMPUTERS**

NEWS

Personal computer conference scheduled at New York Coliseum

ENGLEWOOD CLIFFS, N.J. — The third annual Personal Computer Expo Conference is scheduled for June 17-19 at the New York Coliseum in New York.

Speakers at the three-day conference will include J. Leland Strange, president of Intelligent Systems Corp., who will address the enhancement market and the criteria for selecting these products, and William Gannon, publisher of "Software News," who will discuss the buying criteria for personal computer users in large corporations.

Safi Qyereshy, research president for AST Research, Inc.; Richard

Clows, vice-president of Techland Systems, Inc.; and Ralph Ungermann, president and chief executive officer at Ungermann-Bass, Inc., will address the issue of micro-to-mainframe communications links. Other sessions will discuss local-area networks, multiuser strategies, application generators and cartridge tapes.

Registration fees for the program are \$25 per day and \$50 for two or three days. Before May 29, registration costs \$20 per day or \$40 for two or three days. More information is available from Personal Computer Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

WORDSTAR from page 18

it from the selections on the Print Font menu. This menu is related directly to the type of printer driver selected by the user when installing the package and therefore will not include the proportional spacing option if the printer type is incapable of it.

With Wordstar 2000, the output produced on the test printer with the proportional wheel did not display the haphazard use of white space between words so prominently when using justified margins with Wordstar.

Wordstar 2000's memory requirement of 256K bytes stands in stark contrast to Wordstar's 64K bytes. While this presents no particular problem, since most personal computers are configured well above the

minimum, it is an indication that Wordstar 2000 is part of the latest generation of software applications, such as Lotus' Symphony and Framework, that is optimally designed for use with hard disk-based systems like the IBM Personal Computer XT and the Personal Computer AT rather than a Personal Computer with dual floppy disks.

The second chart illustrates the wide divergence in elapsed time when performing some standard file and editing tasks using Wordstar 2000 on the Personal Computer with dual floppy disks as opposed to Wordstar

2000's performance on the Personal Computer AT. As is evident from the graph, the performance of these tasks with Wordstar 2000 on the Personal Computer AT is similar to the performance of these tasks with the original Wordstar on the Personal Computer.

This relatively sluggish behavior of Wordstar 2000 on dual floppy disk systems was obvious at other times during lab testing, even when performance was not at issue. For example, when using a global search and replace procedure to remove hard carriage returns from an Ascii file, the auto paragraph reform feature, invoked with every removal, worked excruciatingly slowly on the Personal Computer. The exact same procedure when performed on the Personal Computer AT produced strikingly different results — efficient performance well within the bounds expected of today's personal computer word processors.

Hard disk recommended

Given the experience of Wordstar 2000 on a floppy disk system, we must underscore Micropro's recommendation that Wordstar 2000 be used with a hard disk for the most satisfactory results.

There is much to recommend the upgrade from Wordstar to Wordstar 2000 to those businesses currently using Wordstar under MS-DOS. First of all, all document files created with Wordstar can easily be converted to the new format used by Wordstar 2000. All that is required to upgrade is to remove the dot commands, choose or create the appropriate style format and run a simple conversion utility.

While the Wordstar pro in the office will be thrown off at first by the new mnemonic system, all but the most hard-core will probably adapt more quickly than the initial experience would indicate. This adjustment is hastened in great part by a similarity in screen design and overall approach to word processing that relate the two versions despite the enormous differences in command design and features offered.

The final inducement for the business considering upgrades centers around the ease of use issue. Wordstar 2000 with its mnemonic system and extensive on-line help goes a long way toward supporting the divergent needs of less sophisticated types of business users.



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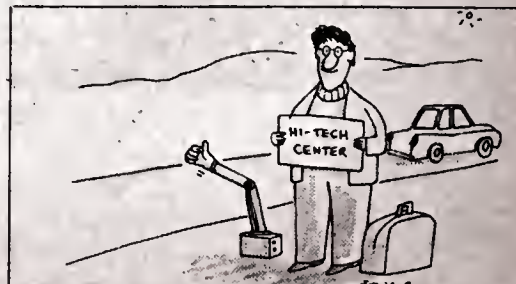
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NEWS

IRS enlists system's help in leaning on tax cheats

By Kathleen Sullivan
CW West Coast Bureau

ATLANTA — "A lien is like flypaper. It sticks to you no matter what you do." For the recalcitrant taxpayer who, through design or neglect, has failed to pay what the U.S. government considers its just due, the words of Conrad Clapper of the Internal Revenue Service serve as a reminder that the IRS has a tool at its disposal for dealing with the problem of nonpayment: a tax lien.

"A federal tax lien is a notice to the world that someone owes us money," said Clapper, who works as the assistant regional commissioner of collections in the IRS' Atlanta office.

At present, when the IRS places a claim on a taxpayer's property as security for unpaid taxes, agency staff members rely on an elaborate filing system and a lot of paper shuffling to handle the lien.

But at a variety of beta test sites — in Arkansas, Florida, Georgia,

”

'A lien is like flypaper. It sticks to you no matter what you do.'

— Conrad Clapper
Internal Revenue Service

Mississippi, North Carolina, South Carolina, Tennessee and Virginia — the IRS has installed an AT&T Unix-based computer system that could eventually replace its manual operations nationwide.

Within these offices, Clapper said, IRS staff members have begun the process of converting a large number of existing paper liens to electronic records and entering new liens into the system's relational data base.

Instead of filling out a variety of legal forms and the necessary supporting documents by hand, IRS staff members at the test sites are calling up the appropriate forms on their computer screens to enter information. The system generates hard copies of lien reports on preprinted forms, which are then forwarded to a local courthouse, where the lien is recorded.

The system is also designed to help the IRS keep track of what happens after a lien has been filed, said Elizabeth Nichols, president of Digital Analysis Corp., a Reston, Va.-based software consulting firm that is working with the IRS on the new system.

Show links between liens

For instance, the data base will keep track of changes in the taxpayer's residence and marital status, she said. In addition, the system will show the links between liens that have already been filed.

"Suppose I don't pay my taxes after I've filed a 1040 form under the name Betsy Nichols, and the IRS places a lien on my property," Nichols said. "Then suppose I get married and become Betsy Smith. Again, I don't pay my taxes and another lien is filed. After that, I found a company called Digital Analysis, which I run poorly. I neglect to pay the firm's

Social Security tax, so the IRS files a third lien."

The data base will keep track of all those changes and reveal the links between the three liens, she said.

Zilog supermicrocomputers

The IRS' system is currently running on supermicrocomputers designed by Zilog, Inc., a Campbell, Calif.-based subsidiary of Exxon Corp. The IRS has installed Zilog's System 8000 Model 31 computers, which are built around the company's 16-bit Z8000 microprocessors. Each system supports 1M byte to 4M bytes of main memory and up to four 80M-byte disk drive storage modules.

The IRS is using a relational data

base designed by Unify Corp., a Sacramento, Calif.-based company. Clapper said the size of the data base will vary from one office to another, depending on the size of the operation. He estimated that a medium-size district office such as the one in Seattle, which might be tracking about 150,000 liens, would require about 50M bytes of storage.

Clapper said the agency itself did not make the decision to buy the Zilog systems. But it did need to make a decision on which data base manager to use, so the agency enlisted the help of Digital Analysis. According to Mark Loftin, a computer systems analyst in the IRS' Atlanta office, the agency chose Unify after seeing a se-

ries of benchmark tests done on a Digital Equipment Corp. VAX PDP-11.

"We found that the interface with the C [language] programs was much better than [that of] any of the other data base managers we were looking at," Loftin said. He listed Unify's query language, report writers and screen painting function as strong points of the system.

According to Clapper, the IRS expects that the system will result in "tremendous savings in human resources" as well as the elimination of a "great amount of paperwork." In addition, he said, the automated lien system will help ensure accuracy in the agency's record keeping.

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T1 technology: Mux mart's building block

Still in their commercial infancy, T1 multiplexers are becoming software controlled; support new multinode network managers

By James Connolly
CW Staff

A three-toed sloth could have used the digits of his foot to count T1 equipment vendors back in 1981.

The only significant customers to be served were AT&T, its operating companies and some foreign telephone companies. The broad-digital communications pipelines were expensive and used almost exclusively to interconnect Ma Bell's central offices.

But the sloth would need a calculator for his tally today. In the coming five years, T1 may become the type of marketing buzzword that AT&T Unix, micro and spreadsheet are now. Carriers have been slashing prices for the bandwidth, and dozens of vendors are leaping into the marketplace with hardware that they claim will let customers build their own private networks.

T1, a technology originated by Bell Laboratories for a 1.54M bit/sec transmission, can be the foundation for an integrated private corporate network carrying a continually shifting load of data, voice and video transmissions. T1 technology is on the verge of a market explosion, according to vendors and communications consultants.

Essentially, a multiplexer combines numerous lines into a single, higher speed transmission line. In the case of the T1 multiplexer, the 1.54M bit/sec line is split initially among 24 64K bit/sec voice-grade lines. The newer, more intelligent multiplexers combine or subdivide those 24 channels several times to yield as few as one large channel for video and other high bandwidth applications, or as many as 200 channels at speeds ranging from 50 bit/sec up to 1.34M bit/sec.

The T1 multiplexer is the tool a telecommunications manager uses to allocate pieces of the T1 pipeline, which could be a copper, fiber-optic, satellite, lightwave or microwave link connecting two buildings on a campus, across town or 3,000 miles apart.

While large private networks and even simple T1 links may not be for every organization, the prospect of a price war among carriers and the addition of more intelligence to multiplexers and to the long-haul carriers'

switches mean new flexibilities for major communications users.

T1 may be a 27-year-old technology, but users have had relatively little experience with it. Its commercial application is in its infancy, but it has already sped into a third generation of products, moving from hardware-oriented to software-controlled multiplexers and now to a new line of multinode network managers that features multiplexing as a secondary function.

A December 1984 study by International Data Corp. (IDC) of Framingham, Mass., predicted the worldwide dollar market for all multiplexers will grow from \$280.5 million in 1983 to more than \$1 billion in 1988. That overall growth will occur despite a downturn in sales for

low-end multiplexers, the study reported. At the high end, time-division multiplexers, (all T1 multiplexers inclusive) which allocate specific time slots to each of the slower speed channels entering a multiplexer, will carry the market, according to IDC. The study said T1 multiplexer sales will increase an average of 53.5% annually, from \$14 million in 1983 to \$119.7 million in 1988.

Until AT&T introduced its Accunet line of T1 services in 1983, T1 was used primarily for central office-to-central office voice links. In the late

1970s, T1 became available on a limited commercial basis for special installations, but it was priced high, costing the same as the 24 voice-grade lines it was meant to replace. But when federal and state lawmakers ruled that AT&T's Telpak multiline discount rates were discriminatory, T1 emerged as Telpak's replacement.

"It is pretty tough to get around the fact that T1 is becoming the fundamental building block of communications. It's a nice general building block that is becoming standardized. Another reason [for its popularity] is economic. If you look at the cost compared with 24 voice-grade circuits, it's not that impressive, but if you look at the cost of 24 [AT&T Dataphone Digital Service] lines, there is no way you can get around the benefit," said Jeff Palmer, director of industry marketing for BBN Communications Corp., a wide-area private network

See T1 page 30

AT&T sets pace for mux vendors with T1 services

By James Connolly
CW Staff

Just as AT&T's promotion of T1 trunks for commercial use in 1983 was a catalyst for the boom in the T1 market, AT&T Communications' plans for new T1 services are likely to set the parameters for vendors of multiplexers and other T1-related equipment, according to industry observers.

From the mid-1960s until two years ago, the T1 technology developed by Bell Laboratories in 1958 was used primarily to link AT&T's own central offices. Now, with dozens of equipment vendors rushing to market with multiplexers and T1 network management tools, the services that AT&T has recently introduced and hopes to offer may determine what features those vendors will include in their products.

Roger Blanton, product line manager for Paradyne Corp., observed, "Dacs [Digital Access and Cross-Connect System] compatibility in a multiplexer is going to push everyone that way. It will let a user sit at his terminal and switch channels at his command. The switching is at the AT&T central office. The customer only makes the request, and the switch does the rest."

Dacs is the switching system and data base that AT&T now uses in its central offices. AT&T introduced Customer-Controlled Routing (CCR) Jan. 27, the service that actually gives the customer the ability to re-route lines or reallocate T1 band-

See AT&T page 30

SELECTED T1 MULTIPLEXERS

Company	Amdahl Corp. Marina del Rey, Calif.	Avanti Communications Corp. Newport, R.I.	Coastcom Concord, Calif.	Codex Corp. Mansfield, Mass.	DCA, Inc. Norcross, Ga.
Product	2211	Ultramux	D/I Mux	6240	Netlink
Maximum Channels	96	64 sync or voice; 128 async	144 sync, 128 async, 24 voice	64 sync, 128 async, 64 voice	128 sync or async
Channel Speed (bit/sec)	768K sync, 19.2K async	1.36M sync, 50 to 9.6K async	1.53M sync, 19.2K async	64K to 1.3M sync; 9.6K async	1.008M
Aggregate Transmission Rate (bit/sec)	1.54M or 2.048M	3M to 10M	1.54M	56K to 1.54M or 2.048M	1.54M or 2.048M
Voice/Data/Video Support	Yes	Yes	Yes	Yes	Yes
Date First Installed	1982	1983	1981	1984	1983
Number Installed	5,000 (Includes earlier 2200)	200	800	Not available	50+
Type of Voice Modulation	Amdahl Enhanced CVSD	CVSD	PCM, ADPCM	CVSD	CVSD
Manufacturer or OEM	Manufacturer	Manufacturer	Manufacturer	OEM	Both
Price	\$13,000 (7 to 10 channels) to \$50,000	\$12,000 (16 channels) to \$60,000	\$2,500 (8 channels) to \$20,000	\$20,000 to \$75,000	\$6,000 (base) to \$40,000-\$50,000 (average)
Vendor Comments	Any component can be replaced under power. Drop and insert; voice speeds of 16K, 32K or 64K bit/sec, selectable from keyboard. Bit-interleaved; satellite buffer; sync and async support on single card.	Supports statistical multiplexed async channels; alternate path and channel routing; menu-driven; dynamic bandwidth allocation.	Hardware-driven; D3/D4-, CCR- compatible; 64-bit channelization; drop/insert capability.	Software-based; user-program- mable system parameters. Multiple external digital clocks on all channels. DS-1 compatible. Redundant common logic, power supply and driver.	Software-based; parameters and diagnostics console-controlled. D4 framing; dynamic band- width contention. Dacs DS-1- level compatibility.

NEWS

T1 technology riding high, but market support lagging

While many see T1 technology as a key tool for the future, comparatively few companies have actually made a commitment to it.

When a speaker at the recent Communications Networks 1985 conference in Washington, D.C., asked an audience of more than 200 telecommunications managers how many had integrated T1 networks, a small fraction raised their hands. But when asked how many were looking at, or would like to use T1 products and services, almost every hand in the room shot up.

A number of factors — competition among carriers, fiber-optic installations and technical improvements in the multiplexers themselves — are driving the T1 market, while other factors are holding it back, at least temporarily.

"We are continuing to look at T1,

although we aren't using it now," said Roger Milam, communications services general manager for Delta Air Lines, Inc. "We're not pleased with the lead times AT&T is quoting, which have been six to nine months. I've requested information on cost comparisons for T1 channels, but it hasn't been provided yet. I get the impression, when attending some of the joint airline meetings that are still allowed, that T1 use isn't widespread among the airlines, that the others are at the same stage. They're looking at it but haven't made any commitments."

Several users said they expected

at least a one-year lead time in getting T1 circuits.

Jeff Palmer, director of industry marketing for BBN Communications Corp., said the trend has been to phase-in T1 circuits. "A few organizations are further advanced than others as far as experience," he said. "They may have said, 'Hey, let's give this a try and switch over a few lines initially. We can phase it in, then based on favorable experience, we'll switch over more lines and let the network grow.'"

Plans to add lines, voice traffic

William E. Kane, manager of tele-

communications for SEI Corp. in Wayne, Pa., said he is using one local T1 data line now and that he anticipates adding more lines and voice traffic.

He reported that replacing most of the company's data lines with T1s is "awash now," because it would take 35 to 40 months to pay off \$50,000 to \$60,000 in equipment costs, despite paying only an estimated \$10,500/mo for a Wayne-to-Boston T1 line rather than \$600/mo per line and up to \$6,000 in toll charges for 12 9.6K bit/sec leased lines.

Kane said the flexibility would make T1 most attractive. "We might possibly need to do some rerouting 1½ or two years down the road. It would be very nice to be able to reconfigure a network on our own," he said.

“
We're not pleased with the [T1] lead times AT&T is quoting.
”
— Roger Milam
Delta Air Lines, Inc.

SELECTED T1 MULTIPLEXERS

Company	Datatel, Inc. Cherry Hill, N.J.	Gandalf Data, Inc. Wheeling, Ill.	General Datacomm Industries, Inc. Danbury, Conn.	Infotron Systems Corp. Cherry Hill, N.J.	Paradyne Corp. Largo, Fla.
Product	DCP9100	GLM 528	Megamux +	Infostream	DCX-T1
Maximum Channels	96	128	54	128	96
Channel Speed (bit/sec)	300 to 1.024M	Up to 19.2K	9.6K async, 1.024 sync	19.2K async, 768K sync	Up to 448K
Aggregate Transmission Rate (bit/sec)	1.54M	1.54M or 2.048M	2.048M	1.54M or 2.048M	1.54M
Voice/Data/Video Support	Yes	Data only	Yes	Yes	Voice and data only
Date First Installed	1983	1984	1981 (Replaced Megamux in 1985)	1985	1984
Number Installed	250 to 500	Not available	5,000	Not available	About 60
Type of Voice Modulation	PCM, CVSD	None	ADPCM, CVSD	PCM with ADPCM upgrade	CVSD
Manufacturer or OEM	Manufacturer	Manufacturer	Manufacturer	Manufacturer	OEM
Price	\$8,000 (2 channels) to \$80,000	\$3,240 (32 channels)	\$12,000 (22 channels) to \$25,000	\$45,000 (64 channels) to \$78,000 (128 channels)	\$32,000 (48 channels) to \$60,000
Vendor Comments	Console monitoring and control; dynamic clock tracking. D4Fe-, Daccs-compatible. Redundant common logic and power.	Modular design; built-in, autoequalized T1 modem, rack-mountable. Designed for use with Gandalf Pacx switch.	Software-controlled through single console or CRT. Day/night alternate channel configurations; redundant power supply; D4 frame formatting.	Software controlled from user-selected location. Dynamic circuit allocation based on user priorities. Drop and insert; D4Fe-compatible; redundant central logic link interface and power supply.	Supervisory control port; D4Fe-, Daccs-compatible; redundant power supply and common logic.

CW CHART

SELECTED T1 MULTIPLEXERS

Company	Racal-Milgo, Inc. Fort Lauderdale, Fla.	Scittec Corp. Middletown, R.I.	Tau-Tron, Inc. Chelmsford, Mass.	Tellabs, Inc. Lisle, Ill.	Timplex, Inc. Woodcliff Lake, N.J.
Product	Omnimux T1	BSPT-1	Intraplex Models 153, 155	430 T-Plexer	Link/1
Maximum Channels	96	128	24	128	200 sync
Channel Speed (bit/sec)	460K sync, 19.2K async	50-1.344M	56K	1,200 to 512K	50 to 256K
Aggregate Transmission Rate (bit/sec)	2.048M	1.54M	1.54M	1.54M or 2.048M	2.048M
Voice/Data/Video Support	Voice and data only	Yes	Yes (slow-scan video)	Yes	Yes
Date First Installed	1984	1982	1983	1984	1983
Number Installed	Not available	100 to 150	200	Less than 100	Not available
Type of Voice Modulation	Enhanced CVSD	ADPCM, CVSD	PCM	PCM, ADPCM	CVSD
Manufacturer or OEM	OEM	Manufacturer	Manufacturer	Manufacturer	Manufacturer
Price	\$10,000 to \$60,000	\$3,990 (4 channels) to \$65,000	\$1,970 (base for Model 153) \$2,290 (base for Model 155)	\$6,000 to \$60,000	\$7,600 (no redundancy) to \$100,000 +
Vendor Comments	Modulates voice at 16K, 32K or 64K bit/sec. Software-strappable; single console control of up to 54 Omnimuxes.	Bit-interleaved TDM with statistical mux slide-in capability. Software-based menu-driven. Redundant power supply and logic card.	Model 153 is point-to-point; Model 155 is drop-and-insert multipoint. Crystal-based standby clock; transmit data framing monitor.	Software control; multiple-node control from signal site. Dynamic bandwidth allocation based on time of day or event; bit-interleaved.	Dynamic allocation; multiple data links; CCR compatibility; D4 framing. Network management and reconfiguration; software-driven.

CW CHART

NEWS

Network features push muxes beyond third generation

By James Connolly
CW Staff

The ability to reconfigure a network, whether it means rerouting a long-haul line through a node 500 miles away when a circuit fails or shifting from a voice-intensive bandwidth during the day to data-intensive one at night, is one of the features that separates the various

generations of multiplexers.

AT&T Communications wants to offer that capability through its Customer-Controlled Routing (CCR) feature, which allows the customer to switch circuits via an on-premise dumb terminal tied to an AT&T central office switch and data base (see story page 24). Accord-



ing to some vendors, CCR compatibility, or compatibility with AT&T's D4 channel bank and D4 Fe extended framing format, will soon be required for success in the multiplexer market.

The earliest multiplexers provided 24 frequently fixed bandwidth channels. A second genera-

tion offered a range of 24 to 144 channels at varied bandwidths. Some second-generation multiplexer vendors claimed that their products allowed for dynamic bandwidth allocation and rerouting, although the products were still hardware-oriented.

While the distinguishing lines between generations are blurred, multiplexers in-

troduced within the past year have been billed as software-driven, with rerouting and control of several multiplexers from a single site. Vendors have claimed the ability to configure drop-and-insert networks, interconnecting three points with only three multiplexers — compared with up to six multiplexers the interconnection often requires — and switching all communications through one of the three. They are said to allow pre-programmed bandwidth reallocation based on the time of day and user-selectable voice-modulation techniques.

Those techniques include Pulse-Code Modulation (PCM), which digitizes voice signals at 64K bit/sec, and Adaptive PCM (ADPCM) and Continuously Variable Slope Delta (CVSD), which both digitize at 32K bit/sec. Several vendors also claim the ability to compress ADPCM and CVSD to 16K bit/sec.

"I think we're still early in the life cycle for multiplexers. The first T1 [multiplexers] that really provided assignable bandwidth — the ability to really chop up the bandwidth — first started appearing just three or four years ago. They were hardware configurable, so if you wanted to change a line, you had to stand next to the box," said Jeff Palmer, director of industry marketing for BBN Communications Corp. He said the most intelligent devices are just now hitting the market or are still in beta test sites. That equipment, in which multiplexing is a function secondary to network management, can direct 20 or more multiplexers serving up to 500 locations.

Gerald L. Mayfield, vice-president of the consulting firm DMW Group, Inc. in Stamford, Conn., said third-generation products include multiplexers such as Timeplex, Inc.'s Link/1, Avanti Communications Corp.'s Ultramux and products whose vendors downplay the multiplexing capability in favor of a switching capability, such as Network Equipment Technologies' Integrated Digital Network Exchange.

Mayfield said one key feature for future multiplexers will be the ability to tie private branch exchanges (PBX) into AT&T's channel banks. Network Equipment Technologies recently announced that its product had been certified by Rolm Corp. for use with Rolm's CBX PBX and its CBX II computerized branch exchange.

Palmer warned potential customers, "You have to be aware that you are buying up big chunks of capacity and that you are dealing with a technology that is just being rolled out."



Benjamin West. *The Death of General Wolfe*, 1770. Courtesy The Bettmann Archive.

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NEWS

D.C. to host federal OA, software meets

Fose expo to focus on integrated systems; software show a first

WASHINGTON, D.C. — The Federal Office Systems Expo '85 (Fose Expo) and Fose Software conferences will be held March 4-7, at the Washington Convention Center here. The expositions and conferences are aimed at corporate or government executives, managers, directors, owners and department heads.

The six tracks of the "Integrated Office Systems — Redefining the Bottom Line" theme at Fose Expo are communications and networking, human dimensions, implementation, technologies, managing information and electronic records.

The Fose Software conference and exposition — a new addition to Fose Expo, is designed for large-volume software users with special emphasis on the federal government, the Department of Defense and large-scale business purchasers.

Speakers will include Adam Osborne, who will speak on "The Software Industry Shakeout;" Tom Peters, coauthor of *In Search of Excellence*; Commodore James B. Whittaker, author of *Strategic Planning in a Rapidly Changing Environment*; and George Plimpton, author of *Paper Lion*, who will speak on ele-

ments of discipline and planning necessary for the success of office automation.

The price of attendance is \$295 for either Fose or Fose Software and \$395 for both conferences. For a single day at Fose, the price is \$95.

Single-day prices for Fose Software are not available, however, there is an exposition-only price of \$10 at the door.

More information is available from National Trade Productions, Inc., which is located at Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

AT&T from page 24

width, according to Joseph Trombetta, district manager for service marketing of AT&T's Accunet and Skynet services.

"We expect to have a positive impact on the market. We believe CCR responds to the customer's need to adapt the network during the week, rather than having to place a work order," said Trombetta, noting that a customer can implement a preprogrammed alternate route in 15 minutes using CCR, while a work order could mean a three- to six-week delay in the past.

Alternate routes and channel allocations, which allow a customer to switch among configurations with different voice, data and video loads, can be stored in AT&T's data base and called up by a customer at a standard dumb terminal as needed. Trombetta noted that a customer might have a voice-intensive network during the day and wish to switch to a data-intensive network at night for bulk data transfers.

Initially, CCR is being offered in 42 U.S. cities served by AT&T's Accunet Reserved 1.5 service.

Additional AT&T services

Trombetta also said that two other AT&T services will impact the T1 market.

On Jan. 5, AT&T implemented M-44 Multiplexing, which allows Accunet T1.5 service customers to increase the capacity of their circuits from 24 to 44 voice-grade channels using bit compression. That process compresses the normal 64K bit/sec data stream into two 32K bit/sec streams. It is available in two configurations: between an AT&T central office and a customer's location or between two AT&T central offices.

The third new service is M-24 Multiplexing, for which the company has a tariff pending. With M-24, a customer would pay a flat fee for the T1 function plus a per-plug fee for up to 24 plugs, which means the customer only pays for that part of the T1 pipeline that it needs, according to Trombetta.

Another factor that could impact T1 growth is the prospect of a price war among carriers. One shot already fired in that war was AT&T's recent filing of proposed tariffs that would raise by an average of 30% prices for its Dataphone Digital Service, dedicated digital lines handling 2.4K bit/sec to 56K bit/sec transmissions. Meanwhile, the company proposed cuts in T1 services ranging from 9% to 13%.

T1 from page 24

supplier. Palmer noted that T1 is a commodity the carriers can sell with little added value.

Bradley O'Brien, president of Perspective Telecom, a Paramus, N.J., research firm, added, "First, T1 means some improved private-line economics for people who have that much traffic between locations. It enables them to reduce their trunk-line costs.

"Number two, and more importantly, it gives the customer flexibility to manage his own bandwidth. It gives the customer a first step toward a rudimentary [Integrated Services Digital Network]," he said.



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NEWS

World Bank learns value of effective IRM strategy

By Jeffry Beeler
CW West Coast Bureau

CARMEL, Calif. — By devising a strategy for integrating its key electronic technologies, the World Bank has gained a fresh awareness of how much its survival hinges on information resource management (IRM), according to the organization's IRM director, Mel Ray.

Before the bank embarked on a project to develop its first overall IRM strategy in November 1982, Ray said "we hadn't fully understood" information management's crucial role in the institution's efforts to expand its international membership.

Ray's comments came during a private interview at an IRM-related symposium sponsored by the Sunnyvale, Calif.-based Institute for Information Management, a subsidiary of Boole & Babbage, Inc. The three-day workshop, which attracted MIS directors and chief information officers from some of the U.S.'s best-known companies, ended on Jan. 23.

During the executive roundtable's opening-day keynote address, Ray recounted some of the World Bank's experiences in creating its IRM strategy, outlined its development procedures and enumerated the project's benefits.

In essence, the World Bank adopted a two-pronged approach to the task of formulating an organization-wide strategy. On one hand, it used IBM's Business System Planning methodology to take a top-down view of its operations, analyze its data flows and identify vital in-house processes or functions.

At the same time, the bank also examined itself from a bottom-up perspective in an effort to discover how its corporate information architecture applied to each of its constituent

operating groups, Ray said.

The ultimate aim of the bottom-up view was to "optimize an information architecture at the individual unit level" and allow users to acquire data "as near to where a transaction takes place as possible," he said.

Merging bottom-up, top-down views

By merging the bottom-up and top-down views, the World Bank ultimately produced a preliminary version of an IRM strategy that reportedly defined the information needs of the institution's managers, professionals and support staff. The strategy, which is continually evolving, will also stimulate individual IRM planning among the bank's vari-

ous operating units, Ray said.

In all, development of the strategy took about nine months and required the participation of 21 senior bank managers, more than 1,200 staff members, 14 consulting firms and eight internal advisory committees.

"Without question, the No. 1 benefit we've gained from creating an IRM strategy is an improved understanding of our information resource" and its strategic significance, he said.

For the \$100 billion World Bank, continued existence depends on sustained support from the 149 national governments that now comprise its constituency. But to preserve the constituency, the organization needs

both information and the ability to manage it effectively.

"What we say about ourselves and our constituents is extremely sensitive, and we wouldn't be able to make accurate statements without good information," Ray said.

Another benefit of the recently created IRM strategy was a change in the bank's internal organization. In the past, each of its major information systems technologies, including office automation and communications, was managed by a different in-house entity. Now, all those related areas of responsibility are consolidated under a single corporate officer, whose mission is to promote technological integration.

Worden to open DP, MIS meet

NASHVILLE — The 1985 Annual Conference of the Association for Systems Management will be held here from April 21-24 at the Opryland Hotel. The conference is designed for MIS and DP managers and directors and junior and senior analysts.

Retired U.S. Air Force Col. Alfred M. Worden, the command module pilot for the *Apollo 15* space mission, will deliver the opening luncheon address. The meeting also will feature a two-day miniconference on managing information centers, two full-day programs on executive support systems and communication skills and two special study tracks on "Integrating Systems Technologies-1985" and "Managing Interpersonal Relationships."

The admission price for the full program is \$475 for members and \$575 for nonmembers. A two-day program is priced at \$395 for members and \$475 for nonmembers. One day is available for \$180 for members and \$260 for nonmembers.

More information is available from Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

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The New Cincom: 10 the only software ve

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#2 Fourth Generation Application Development

The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. In more than 1,500 complex production environments, MANTIS is dramatically reducing the application backlog through its powerful ability to "prototype", refine and commit the application to production in one interactive sitting.

#3 Manufacturing Control Software

CONTROL™: MRPS is our sophisticated manufacturing control system that is fully integrated

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The New Cincom: Integrated Family of Software Technologies

The New Cincom's family of information management solutions comprises five integrated software systems for environments from the mainframe to the micro.

- Relational Data Management
- Application Development
- Business Control Applications
- Decision Support
- Network Management

Relational Data Management
The foundation of our product line is the Nucleus relational data management system. It provides a logical view of data that insulates programs from the DBMS, data structures, accessing and navigation strategies, and physical environ-

ments. Nucleus provides both true data structure independence and the high performance needed for today's production environment. The power of Nucleus is incorporated within TIS™, our family of integrated information management products for the IBM environment; and the ULTRA INTERACTIVE DATA BASE SYSTEM™, our product family for the DEC™ VAX™ environment. The unique, NUCLEUS-based architecture of TIS and the ULTRA INTERACTIVE DATA BASE SYSTEM assures compatibility and eliminates conversion across the IBM and DEC environments.

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The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. A major breakthrough in software technology, MANTIS is the only system available that provides complete, beginning-to-end, on-line application development—all in one sitting. By using highly effective methodologies such as prototyping, MANTIS helps you dramatically reduce and even eliminate your application backlog.

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A high priority in our needs approach to providing information management solutions for the business community, is the personal/local level of needs of end-users in both the mainframe and micro environments.

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For the end-user in a micro environment we offer SeriesOnePlus™, our comprehensive package of integrated programs that satisfies a variety of end-user information-handling

needs, including: writing reports, managing files, and compiling and analyzing data. And when combined with PC CONTACT, your SeriesOnePlus programs can incorporate both mainframe and personal data. Intelligent Query (I.Q.) is a powerful, fully integrated, relational Query facility that's based on Artificial Intelligence concepts. Easy-to-learn and use, I.Q. handles not only ad hoc requests, but also routine, repetitive requests that can occur within end-user departments.

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The New Cincom: Excellence In Software Technology

The balance of this brochure provides a more detailed overview of our five integrated software technologies. Look closely at what Cincom Systems has to offer. We believe that our new product line (every product either begun or completed in the 1980's) provides the highest degree of reliability, integration, and performance in the industry. When you see for yourself what the New Cincom Systems is all about, you'll understand why the words "Excellence In Software Technology" fit so well under our name.

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with our relational data management technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

#4 Financial Control Software

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#6 The Interactive Mainframe—Micro Link

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access multiple file types stored in the corporate data base for **Decision Support** manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level **Decision Support** we offer **SeriesOnePlus™***. **SeriesOnePlus** includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, **SeriesOnePlus** complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced **MANAGE USER SERIES™** provides powerful **Decision Support** capabilities for the mainframe user. The **MANAGE USER SERIES** combines graphics, text processing and application development tools to enhance the use and display of corporate data.

#9 Client Support

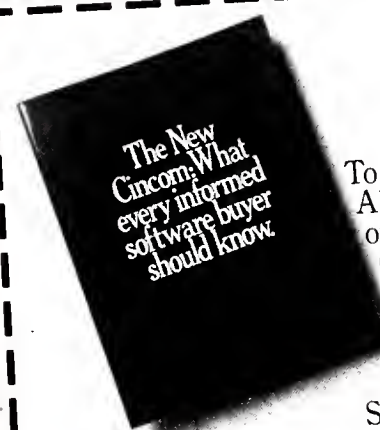
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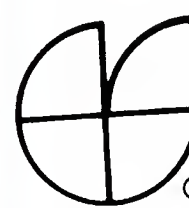


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NEWS

Contestants vie for NSF funds

By John Desmond
CW Staff

WASHINGTON, D.C. — Millions of dollars of supercomputer hardware is at stake in a competition sponsored by the National Science Foundation (NSF) here to choose four supercomputer centers from a total of 22 applicants.

The NSF will distribute a

total of \$22 million in funds authorized by the U.S. Congress among the four chosen centers. Lawrence Lee, the NSF's program director for supercomputer centers, said the winners will be announced April 1.

While the NSF did not disclose the applicants in the competition, recent press accounts indicate that universi-

ties, consortiums of university and industry representatives, and supercomputer vendors are competing to establish supercomputer centers.

The initiative to establish the national supercomputer centers was best stated in the 1982 report from the Lax Panel on Large-Scale Computing in Science and Engineering sponsored by the NSF and the Department of Defense, said Neal Lane, chairman of the NSF's advisory committee for advanced scientific computing.

According to the report, "The problem was that a lot of ... engineering needed to be done, and the research scientists and engineers couldn't get their hands on the supercomputers," Lane said.

The report suggested the following objectives: to provide access to supercomputers for the nation's scientists and engineers who need it, to stimulate a program of education on supercomputers in universities, to provide incentive for industry development of new kinds of supercomputers helping to bring multimillion dollar entry costs down and to develop more software for supercomputers, Lane said.

NSF task force

The NSF responded by forming a task force, which recommended that Congress be asked to fund an advance computing program. Not since the early 1970s has Congress funded computer purchases through the NSF, Lane said. "This really is a brand-new thing and certainly is the first response of the NSF to the Lax report," Lane said.

Kenneth Wilson, professor of physics at Cornell University, which is among the 22 candidates vying to be an NSF supercomputer center, has worked to try to marry the interests of academia and industry in the development of the supercomputer.

"The usual put-down of the computing industry is it tries to list the applications that supercomputers are good for, like oil reservoir simulation, aerospace simulation for aircraft design and power plant simulations. That's a put-down if you accept that approach, because nobody will ever list the applications for the IBM Personal Computer. You couldn't do it," Wilson said.

He added, "It's not the sort of need you can categorize like that. The need is in terms of meeting industry-wide goals. They need to be using simulations in all kinds of applications, with the objective of shortening the product development cycle time."

Ken Widmaier
Director, Operations and Development



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NEWS

University of Alabama sets sights on supercomputer

By Maura McEnaney
CW Staff

TUSCALOOSA, Ala. — The University of Alabama state school system is getting into the computer business.

As part of a state plan to help diversify a primarily industrial economy, the university is preparing to purchase a powerful supercomputer. In fact, the university wants a machine more powerful than anything currently available on the market.

Edward Moore, senior vice-chancellor for the state's university systems, is the chairman of the state's supercomputer committee, which Gov. George Wallace launched last spring. Moore said the university is

considering buying a supercomputer that contains at least four CPUs.

Other specifications include a high-speed memory, capable of processing in a scalar or serial mode at a rate of 100 million instructions per second (Mips), or a vector unit with 500 million floating-point operations per second. Also specified were a random-access memory of 128 million 64-bit words that will be expandable to 256 million 64-bit words and a modular mass storage of one billion 64-bit words expandable to two billion. The university is considering machines from vendors including Cray Research, Inc., Amdahl Corp., Sperry Corp. and Control Data Corp.

Since most machines today pro-

cess at rates below 20 Mips, the machines eyed by the university probably will not be around until 1987, Moore said. Until then there is much work to be done, he said. The university system is waiting for legislative action on a bill granting \$15 million for the purchase and administration of the computer system and the establishment of a communications network.

The site for the supercomputer has not been selected. However, the university plans to establish six access node locations: one for state agencies in Montgomery, Ala., and five at university campuses. Other Alabama state universities involved in the program are Auburn Universi-

ty, the University of South Alabama in Mobile, the University of Alabama branch campuses in Birmingham, Huntsville and here.

Depending on the legislative action, the university system could begin installation of the communications nodes in July, Moore said. Until the time the computer is purchased, university faculty will be trained on an existing machine, perhaps on a supercomputer used by the University of Georgia system. That computer has been in place for about a year.

'Why not?'

But why does the university need such a powerful machine, particularly when a supercomputer resides in neighboring Georgia? "Why not?" said Thomas Bartlett, university chancellor. "You never need it until you have it and develop the capacity to use it."

Among those who will have the most use for the supercomputer are students and professors studying crystallography (the analysis of crystals as a means of designing biomedical products) and fossil fuels. But when Gov. Wallace originally proposed the supercomputer concept, he intended it to be a resource for the business community as well. "The capacity of these things is so enormous that no single agency or institution could use it," Bartlett said.

To defray the \$3 million annual maintenance costs, the university is banking on leasing the system to U.S. defense operations in the Huntsville area, site of the Marshall Space Center, the Redstone Arsenal and the Ballistic Missile Command.

Forms available for DPMA prize

PARK RIDGE, Ill. — Applications for a series of international awards aimed at honoring computer science students, educational institutions and businesses for extraordinary accomplishments are now available from the Data Processing Management Association (DPMA) and its Education Foundation.

The three categories of awards within the program, established in 1984, are business and industry, for organizations said to exemplify excellence in continuing development of information systems professionals; educational institutions, for information science programs in two- and four-year programs; and students, for information science students entering the final year of a two-year associate program or a four-year program. The cash prize in each category is \$2,000.

Individuals and organizations interested in applying for the awards must be nominated by a local DPMA chapter, region or nation. The awards will be presented at the DPMA Houston '85 conference and exposition, scheduled for Oct. 28-30 in Houston.

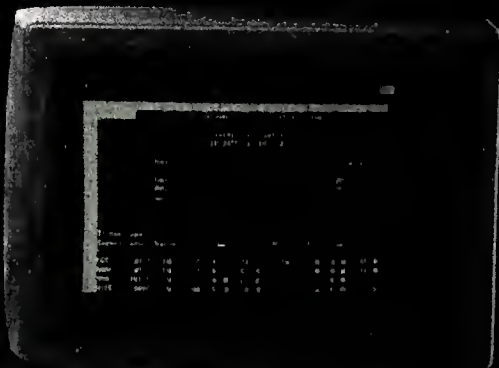
More information and requests for applications are available from Hildegard Klemm, Manager of Educational Services, DPMA, 505 Busse Highway, Park Ridge, Ill. 60068.

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NEWS

Researchers making supercomputers big on campus

By Maura McEnaney
CW Staff

WASHINGTON, D.C. — In response to a call for increased access for supercomputing in the U.S. [CW; Jan. 24, 1983], supercomputers are popping up at several educational institutions across the country.

According to John Connolly, director of the National Science Foundation's (NSF) Office of Advanced Scientific Computing, supercomputers are located at the University of Minnesota, Purdue University, Colorado State University and the University of Georgia.

The NSF's Supercomputer program was established in 1983. In October, the NSF began a \$40 million effort to make supercomputer time available to American scientists with promising research projects, Connolly said.

By April, the NSF expects to announce the es-

tablishment of four supercomputer centers, all of which will be operating by 1986, he said. "The idea is to give our best research people access to the best computation facilities."

This month, Florida State University expects the delivery of a Control Data Corp. Cyber 205 Class 6 supercomputer for the Supercomputer Computations Research Institute (Scri). The institute was established last October in conjunction with CDC and the U.S. Department of Energy (DOE).

According to a university representative, the supercomputer will use 12 units of on-line disk storage containing 4.8 billion bits per unit. Also included will be four to eight on-line tape drives. The Cyber 205 will include 20G bytes of secondary file storage implemented with a CDC Cyber 180-835 acting as file server.

The Scri will arrange access to a supercomputer

for DOE scientists. The DOE will have access to approximately 65% of the computer time and will fund approximately 70% of the project cost.

CDC to provide equipment, personnel

The Florida legislature has appropriated funds and 13 faculty positions for the program, and CDC plans to provide equipment and personnel for the Scri.

Long-range goals for the Scri within computational science will be to develop software in the area of large-memory access with shared CPUs.

In 1987, the university will receive a Cyber 250 that will consist of four million words of local memory and a cycle time approximately four times faster than a Cyber 205. The CPUs reportedly will be accompanied by approximately 128 million words of shared memory, the university representative said.

NCGA meet scheduled April 14-18

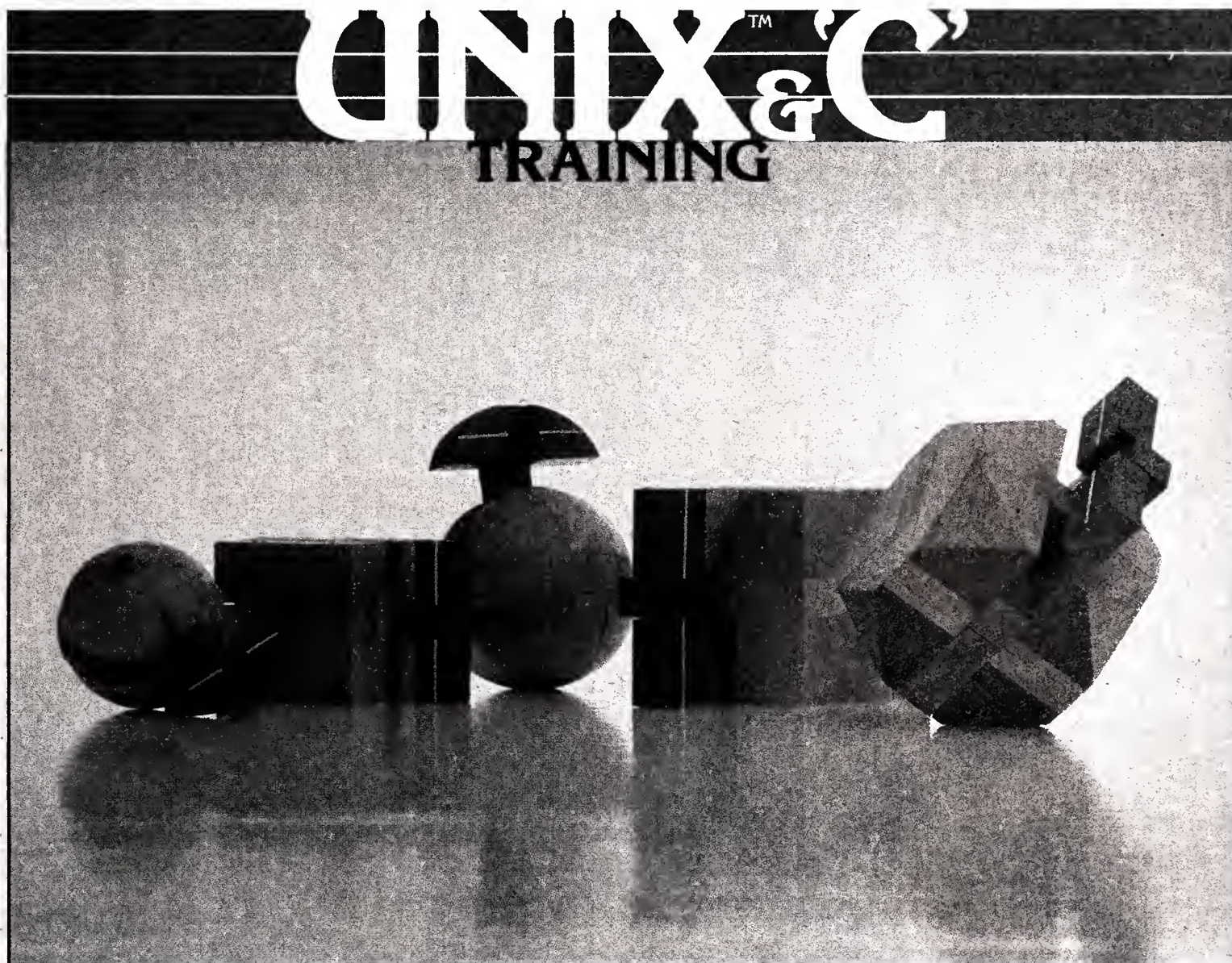
DALLAS — More than 250 computer graphics experts are scheduled to speak during 40 tutorials and 80 technical sessions at Computer Graphics '85, the sixth annual conference and exposition sponsored by the National Computer Graphics Association (NCGA). The conference will be held at the Dallas Convention Center here April 14-18.

According to the sponsor, the conference is designed to keep users up-to-date on the world of computer graphics. The show will feature educational programs in 20 computer graphics applications areas. Papers on developments in architecture, engineering and construction, including automated facilities planning and management, will be presented.

In addition, applications software, data bases and utilization patterns will be reviewed. Topics in the area of computer-aided design and manufacturing (CAD/CAM) will include very large-scale integration design, circuit design and component selection, photo plotting and verification, data base and expert systems for electronic design and electronic simulation and testing. A program on computer-integrated manufacturing is scheduled, and speakers will discuss the increased efficiency and cost benefits from the integration of CAD/CAM.

The price to attend all exhibits is \$10 for non-NCGA members; exhibit attendance is free to NCGA members. The cost to attend all tutorials is \$425 for NCGA members, \$495 for nonmembers. The cost to attend all technical sessions is \$395 for NCGA members and \$460 for nonmembers.

More information is available from NCGA, Suite 601, 8401 Arlington Blvd., Fairfax, Va. 22031.



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NEWS



TURNAROUND TIME

Larry Long

Q In your description of computer literacy, the advice "Be an intelligent consumer of computer-related products and services" is most important.

It is our responsibility in the computer industry to de-emphasize computer literacy as a priority goal in our society. I would prefer that my son learn to think, feel and understand than to find his precocity in the byways of the computer world. Likewise, I seek a prospective employee who can think analytically and creatively and can relate to other people in a sensitive manner. The computer is a fine tool, but can't it be used to meet the tasks at hand?

You imply that computer literacy and "learning to think, feel and understand" are mutually exclusive activities. Many agree with you. And I agree that thinking, feeling and understanding are worthy developmental goals, but I contend that computer literacy can be a part of that development and, perhaps, even hasten progress toward other goals.

When you recommend that the computer be used as needed, you are suggesting that we be reactive rather than proactive to a need for automation. I have always recommended that computer professionals and other users have a storehouse of knowledge that can be applied to a variety of situations.

Q Five months ago I was the victim of a company-wide reduction in white-collar workers. After 18 years of service, primarily in programming, systems and, more recently, in staff capacities, I'm looking for a job in an area that already has 13% unemployment.

Periodically, a position opens up for an experienced programmer. I would be happy to take a programming position and then work up, but my age and recent experience are working against me. The two companies with which I interviewed were seeking people with more current programming skills. I have eight years of programming experience and am confident that I will have no trouble coming up to speed. How can I convince people that this is the case? My wife, who is not employed either, and the children refuse to discuss moving to another part of the country.

Why not demonstrate to prospective employers that you are upgrading your technical skills by taking a few college courses, perhaps in

data base management systems and structured programming techniques. If you get hired next week, fine, you can retrain while on the job. But for now, I would recommend devoting some time to developing marketable skills. On your next interview, stress your educational pursuits and how your systems experience will be complementary to any programming assignment.

If the choice is between employment elsewhere and

unemployment where you are, I hope your family will reconsider.

Q Computer literacy happens to be one of my pet peeves, for exactly the reasons you cite: nobody can define it but everybody is selling it. Your "definition" is as good as any I've seen, but it's nonoperational. Even after reading it, the computer illiterate still doesn't know how to go

about [becoming computer literate]. Computer literacy comes in different flavors. We computer professionals are computer literate, but this level of knowledge is not necessary for the ordinary computer user.

Then what are the necessary conditions for computer literacy? I believe that a necessary condition is an understanding of how a computer "thinks," with all it implies. This means an understanding of the inter-

connection of hardware, the functions of the operating system and the mechanics of software application.

In essence, what every computer illiterate needs is to attend a good seminar on "Computer Mentality." Do you agree?

Perhaps "computer mentality" may someday nudge out "computer literacy" as the term of choice, but both still address the issue of introductory computer education.

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AUSTRALIA

MELBOURNE — Although IBM's IMS data base management system was "the best in its day," it no longer provides the control required, according to Tom Noonan, in-

formation services manager for the Hospital Benefits Association Ltd. (HBA). The system at Victoria's largest health insurance company is being blamed for a mess of files and duplicated data, Noonan said. "HBA's data [problems] evolved as a result of traditional systems development — which is to create a new file for each new application. We now have 42 data bases, about 90 permanent files and around 150 temporary files, with historic in-

formation being kept on about 100 tapes in branches throughout Victoria," Noonan did not say what software will be chosen to replace the 15-year old IBM product.

FRANCE

PARIS — Two massive government projects to promote technology are underway here. The first is the installation of 120,000 microcomputers around France in

popular workshops, where the machines will be made available to children, students and adults. The \$200 million plan calls for equipment from Apple Computer, Inc. and the French companies Thomson, Bull and Leonard.

At the same time, it was learned that a division of the French Postal Telephone and Telegraph administration has ordered 1.5 million smart cards and 50,000 card readers. Bull is expected to gar-

ner the largest part of this order.

JAPAN

TOKYO — Oki Electric Industry Co. has unveiled an integrated personal computer called the 800 Model 60, a high-end addition to the vendor's 800 series. It is said to support multiwindowing software and simultaneous data processing; include Microsoft Corp.'s MS-DOS Version 2.11 and a concurrent Digital Resources, Inc. CP/M Version 3.1; support several communications protocols; and have a main memory of 512K bytes, expandable to 1M byte. The system will be available in March, starting at \$1,832, according to the vendor.

TOKYO — Fujitsu Ltd. has introduced two large-scale office systems called the K-270 and K-280, which are said to be extensions of the vendor's V series. The additions feature enhanced operating systems and conversion tools to integrate other K series and M series systems, according to vendor. The machines are reportedly one-fourth the size of the V series systems and feature main memories of 7M bytes and 9M bytes, respectively. According to Fujitsu, pricing starts at \$37,120 for the K-270 and \$72,800 for the K-280.

NORWAY

OSLO — A computer-aided design software package intended to run on the IBM Personal Computer has been unveiled here by a company called Productivity Support. The menu-driven software, PS-Cass, reportedly allows the user to create his own library of symbols and performs a range of technical drawings and flowcharts, the vendor said. PS-Cass costs \$3,330, according to Productivity Support.

SWEDEN

STOCKHOLM — The Swedish government has recently issued the following standards for portable microcomputers here: The machine must not be heavier than 8½ lb and dimensions must be no larger than 8½ in. by 11 in. for it to be called portable. The operating system may be either CP/M, MS/DOS or the Swedish ABC/DOS and must display at least eight columns or 40 characters.

STOCKHOLM — The number of Swedish computer exports plunged in 1984, according to recently released figures. After a record year in 1983, when exports increased by 78%, the number slumped to 11% in 1984.

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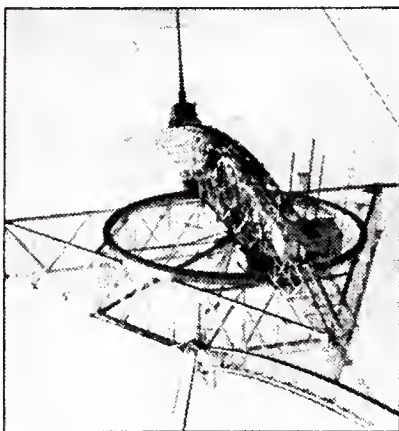


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NEWS



Arecibo Observatory photo
Arecibo Observatory's receiving equipment

Systems widen spectrum of data observation

ARECIBO, Puerto Rico — Tucked away in a small room at the Arecibo Observatory here is the heart of a system that drives the world's largest radio/radar telescope. In this room, three supermini-computers pump data to and from instrumentation that enables scientists to study objects as distant as 15 billion light-years away.

The telescope's reflector dish measures 1,000 feet in diameter, with a 20-acre surface area, which makes it larger than the combined collecting areas of all other radio telescopes ever built. A 600-ton white steel triangular framework containing the receiving and transmitting equipment is suspended by cables nearly 500 feet above

the dish.

The Arecibo Observatory is the major research arm of the National Astronomy and Ionosphere Center, operated by Cornell University and funded by the National Science Foundation. Each year, approximately 150 scientists from institutions all over the world come to Arecibo to perform a variety of experi-

ments. They are selected by a panel of referees after submitting proposals outlining their research projects.

The 118-acre facility was completed in 1963 at a cost of \$9.3 million. Another \$9 million was spent to upgrade the telescope in 1974 when a planetary radar system was installed and the dish was resurfaced with aluminum panels.

Ideal location

The telescope was erected in Puerto Rico because of the island's location: The planets are directly overhead most of the year, it enjoys a stable political climate, is easily accessible from the U.S. and features a relatively constant temperature and gentle winds.

Geologically, the Puerto Rico site was also desirable because the reflector dish sits in a natural limestone depression, which greatly decreased construction costs. The surrounding hills help shield the antenna from radio interference.

Unlike most radio telescopes, which have movable reflectors, the dish here is stationary, but the receiving and transmitting equipment on the structure 50 stories above it can be rotated 360 degrees. It is automatically put in the most advantageous position by one of the observatory's three Harris Corp. superminicomputers.

Three Harris superminis

Arecibo's three Harris superminis are involved in almost every facet of observatory life. According to DP Director Richard Murphy, "The computers do everything from pointing the telescope and [performing] time-critical data acquisition to mundane tasks like accounting. I can examine purchase order data from my office while others may be analyzing pulsar data received across thousands of light-years. The sheer spectrum of our computing requirements is unique."

Murphy said the Harris superminis are versatile enough to perform this range of functions but still have the power and speed to support the observatory's scientific data acquisition and processing needs. Murphy said the observatory started out with a Control Data Corp. batch processing system, which was later replaced by a Harris machine in 1974. The original Harris system handled a variety of tasks, including telescope control and some batch processing. Two more Harris computers were purchased in 1983.

The two additional Harris 100-1 computers are primarily used for real-time comput-

See **OBSERVE** page 41

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NEWS

Telescope assists heavenly findings

Scientists have made a number of major astronomical discoveries using the Arecibo radio telescope in Arecibo, Puerto Rico. These discoveries are as follows:

■ Venus was found to rotate in a clockwise direction, the opposite of all the other planets except Uranus. The planet's period of rotation was determined for the first time.

■ Prior to 1965, it was thought that Mercury always kept the same side toward the sun, regardless of where it was in its orbit. Radar astronomers at the Arecibo Observatory learned that Mercury turns alternate hemispheres to the sun at each approach.

■ Arecibo's radar indicated that the rings of Saturn are composed of chunks of ice and are many layers thick. This was later confirmed by close-up photographs shot by the *Voyager* spacecraft.

■ Scientists at Arecibo discovered millisecond pulsars — stars that have collapsed into dense balls and act as rotating radio lighthouses. These



Arecibo Observatory photo

The Arecibo telescope's dish is fixed to the earth, with receiving equipment suspended above it.

neutron stars contain the mass of a star like the sun but are only about 10 miles in diameter. The matter is so compressed that all the atomic nuclei touch one another. Scientists theorize that pulsar matter may weigh as much as 10 billion tons per cubic inch.

■ In 1980, astronomers at Arecibo bounced the first radar signals off a comet, proving that cometary nuclei are solid rather than gaseous.

Exposition to focus on automated vision

DETROIT — The first international conference and exposition on applied machine vision, Vision '85, will encompass robotics, computer-aided design and manufacturing and flexible manufacturing systems. It is scheduled for March 26-28 at Cobo Hall here.

The exposition is being sponsored by the Society of Manufacturing Engineers (SME) and the Automated Vision Association, recently formed by the Robotic Industries Association. The conference is sponsored by the Machine Vision Association of SME.

Technical session subjects will include an overview of machine vision, applications planning, flaw detection, process verification, image sensing, process control and gauging, R&D, methods

and techniques and robot vision.

The exposition will feature demonstrations of flaw detection and other uses of machine vision in assembly, inspection, related vision components, computerization technology, robotics, software, part identification and sensors. Also featured will be parts assembly, materials handling, work in process, warehousing, guidance and control technologies with vision capabilities.

The full conference fee is \$450 for members and affiliates and \$520 for nonmembers. Single-day fees are \$190 for members and \$260 for nonmembers. A tutorial on machine vision costs \$70.

More information is available from the Public Relations Department, SME, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

OBSERVE from page 40

ing and instrument control, while a Harris 800-1 is used for data acquisition and reduction. The two Harris 100s are identical, interchangeable systems, so when one is being used for data acquisition and instrument control, the other can be used for program development and maintenance tasks.

The Harris 800 is primarily dedicated to data reduction, both interactive analysis and batch processing. It is also used for data acquisition program development, Murphy explained.

Each Harris 100 has 576K bytes of main memory, dedicated operator console terminals and 80M-byte disk drives. The Harris 800 has 1.9M bytes of physical memory, 1.1G bytes of disk storage and connects to 40 terminals in scattered locations around the site. The Harris systems communicate with each other via X.25 networking and share a range of peripherals.

The path of the signals before they reach the computer can be complicated. Sophisticated receivers detect the signal from space. The signal is amplified, converted down to a lower frequency, then travels more than ¼ mile from the antenna to the receiver room. Here it is patched into instruments for filtering, further amplifying or combining with other signals to shift the frequency.

Five terminals are used by the Harris 100s in the data acquisition stage. One is the control room master terminal, where observers start their programs and monitor data. Another is dedicated to displaying the pointing information for the telescope. A third is used for hard copy and logging. One terminal is located in the receiver room, where all the instrumentation is patched together, enabling the observer to run his software and monitor the instruments more closely. The fifth is used for graphics output.

"We developed a data analysis and display system called Analyz that allows observers to plot and monitor the data that's being acquired. It is particularly useful with atmospheric physics experiments and spectral line observations where instrument adjustments and interference detection are important. Every few minutes, it will display a plot on the terminal showing the output of the autocorrelator," Murphy added.

"Efficiency is paramount in this field when you consider that my typical observations last 50 hours," radio astronomer Riccardo Giovanelli said. "The computers have increased our efficiency by 15% or 20%, which is significant in terms of both man-hours and dollars."



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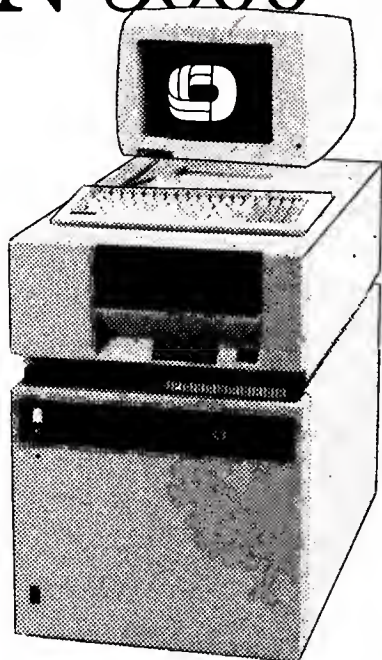
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FEBRUARY 25, NEW YORK — Introduction to the IBM Personal Computer. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 25-26, SAN DIEGO — Software Verification and Vali-

dation. Contact: Educational Foundation of the Data Processing Management Association Seminars, c/o Technology Training Corp., Department SVV, P.O. Box 3608, Torrance, Calif. 90510.

FEBRUARY 25-26, SAN FRANCISCO — PC Local-Area Network Software. Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55425.

FEBRUARY 25-26, ORLANDO, FLA. — Estimate Software Costs. Contact: Educational Foundation of the Data Processing Management Association Seminars, c/o Technology Training Corp., Dept. ESC, P.O. Box 3608, Torrance, Calif. 90510.

FEBRUARY 25-26, BOSTON — Lotus 1-2-3. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

FEBRUARY 25-26, DALLAS — How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

FEBRUARY 25-26, SAN FRANCISCO — Personal Computer Local-Area Networks Software. Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

FEBRUARY 25-27, DALLAS — EDP Auditing & Controls. Contact: Laurie Christie, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

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FEBRUARY 25-27, WASHINGTON, D.C. — Network Protocols and Standards. Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 77092.

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FEBRUARY 25-27, NEWPORT BEACH, CALIF. — Structured Development Forum Conference on Expediting System Development. Contact: Steve McMenamin, The Atlantic Systems Guild, 353 W. 12th St., New York, N.Y. 10014.

FEBRUARY 25-27, HOUSTON — Data Analysis and Logical Design Workshop. Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

FEBRUARY 25-27, NEW YORK — Introduction to Data Communications. Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

FEBRUARY 25-27, DALLAS — Auditing Advanced Computer Systems. Contact: Laurie Christie, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

See FEBRUARY page 46

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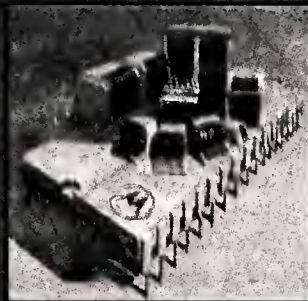
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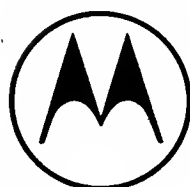
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1984
Motorola/Four-Phase announces The 6000 Series—a milestone in productivity that delivers information processing performance today, and expansion capabilities for tomorrow.

NEWS

FEBRUARY from page 42

FEBRUARY 25-27, WASHINGTON, D.C. — Introduction to Knowledge Acquisition for Building Expert Systems. Contact: Expert-Knowledge Systems, Inc., 6313 Old Chesterbrook Road, McLean, Va. 22101.

FEBRUARY 25-MARCH 1, NEW YORK — IDMS ADS On-Line. Contact: International Computers & Communication Systems, Inc., 10 E. 21st St., New York, N.Y. 10010.

FEBRUARY 25-MARCH 1, NEW YORK — CICS Internal Architecture. Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

FEBRUARY 25-MARCH 1, CHICAGO — Vsam. Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

FEBRUARY 25-MARCH 1,

WASHINGTON, D.C. — Operating Systems for Microcomputers. Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

FEBRUARY 26, NEW YORK — Spreadsheets Using Lotus 1-2-3. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 26, NEW YORK — Introduction to Symphony. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 26-MARCH 1, BOSTON — Unix: A Hands-On Workshop. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

FEBRUARY 26-MARCH 1, BALTIMORE — Digital Image Process-

ing. Contact: Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

FEBRUARY 26-MARCH 1, WASHINGTON, D.C. — Structured Techniques for Software Design. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

FEBRUARY 27, NEW YORK — Advanced Microsoft Word. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 27, NEW YORK — Spellstar and Mailmerge. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 27, NEW YORK — Symphony for 1-2-3 Users. Contact: Center for Advanced Data Process-

ing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 27-28, WASHINGTON, D.C. — Telecommunications Strategic Planning: Don't Start Vast Projects With Half-Vast Ideas. Contact: Marilyn Chasteen, The DMW Group, Inc. 2020 Hogback Road, Ann Arbor, Mich. 48104.

FEBRUARY 27-MARCH 1, CHICAGO — IBM Personal Computers: Communication with Mainframes, Local and Public Networks. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

FEBRUARY 28, NEW YORK — Advanced Lotus 1-2-3. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 28, NEW YORK — Personal Computer Communications Overview. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

FEBRUARY 28-MARCH 1, LONG ISLAND, N.Y. — Dbase III. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

FEBRUARY 28-MARCH 1, SAN FRANCISCO — Auditing MVS Workshop. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 28-MARCH 1, SAN FRANCISCO — SMF Workshop. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 28-MARCH 1, DALLAS — Creative Use of Audit Software. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 28-MARCH 1, DALLAS — Microcomputers: A Hands-On Experience. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 28-MARCH 1, DALLAS — Microcomputer Applications for Auditors. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

MARCH 1, BOSTON — International Data Corp.'s 20th Annual Information Industry Briefing Session. Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701. Also being held March 4 in Toronto.

WEEK OF MARCH 3

MARCH 4-5, WASHINGTON, D.C. — Artificial Intelligence. Contact: EFDPMA Conferences, c/o Technology Training Corp., Department A1, P.O. Box 3608, Torrance, Calif. 90510. Also being held March 18-20 in Boston.

MARCH 4-5, SAN FRANCISCO — Essentials of Personal Business Computing. Contact: U.S. Professional Development Institute, Microcomputers for Management, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 4-5, TORONTO — Information Centers. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

MARCH 4-6, BOSTON — Data Communications: A Complete Overview and Update. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

MARCH 4-6, BOSTON — Purchasing Management and the Computer. Contact: American Manage-

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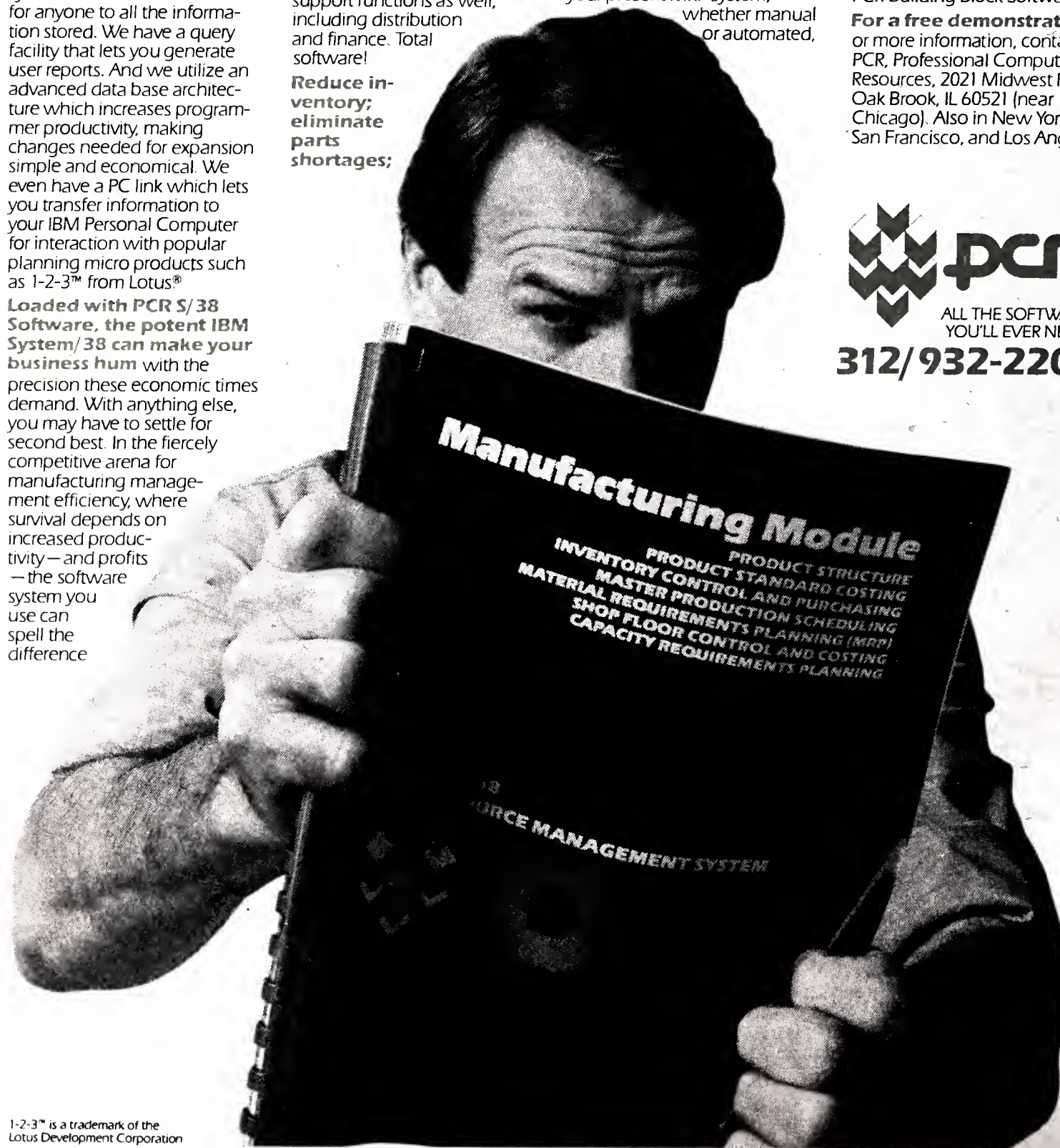
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NEWS

ment Associations, 135 W. 50th St., New York, N.Y. 10020.

MARCH 4-7, SAN FRANCISCO — **Queuing Systems and Computer Applications.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

MARCH 4-7, WASHINGTON, D.C. — **Federal Office Systems Expo (Fose).** Contact: Fose, National Trade Products, Inc., Suite 206, 9418 Annapolis Road, Lanham, Md. 20706.

MARCH 4-6, PARSHIPANY, N.J. — **Job Control Language.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

MARCH 4-6, WASHINGTON, D.C. — **Testing Computer Software.** Contact: U.S. Professional Development Institute, Testing Computer Software, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 4-7, ATLANTA — **Thirteenth Annual Interface Conference and Exposition.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MARCH 4-8, CALGARY, ALA. — **Advanced Systems Analysis.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 4-8, NEW YORK — **CICS Command-Level Programming.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

MARCH 4-8, STANFORD, CALIF. — **Spires Workshop.** Contact: Ruby Lai, Redwood Hall, Stanford University, Stanford, Calif. 94305.

MARCH 4-8, ATLANTIC CITY — **Integrated Services Digital Networks Exposition.** Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

MARCH 4-8, NEW YORK — **Structured Systems Analysis Workshop.** Contact: Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

MARCH 4-8, CHICAGO — **IMS Data Base Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

MARCH 5-6, RESTON, VA. — **The Technical Secretary.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

MARCH 5-7, SAN FRANCISCO — **Effective Management Techniques for Data Processing Managers and Project Leaders.** Contact: Abbott, Galvani Associates, 1850 Union St., San Francisco, Calif. 94123.

MARCH 6-7, SAN FRANCISCO — **Personal Business Computers for Managers.** Contact: U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 6-8, TARPON

SPRINGS, FLA. — **The 1985 Society for Information Management Conference.** Contact: Society for Information Management, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

MARCH 6-8, RENO, NEV. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 6-8, CANNES, FRANCE — **World Congress on Computer and Communications Security and Protection.** Contact: Se-

dep, 8, Rue de la Michodiere 75002 Paris, France.

MARCH 6-8, NEW BRUNSWICK, N.J. — **Systems Network Architecture: Concepts, Design and Implementation.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 6-8, RENO, NEV. — **SAS Applied Time Series Analysis & Forecasting Course.** Contact: SAS Institute, Inc., P.O. Box 8000,

Cary, N.C. 27511.

MARCH 6-8, RENO, NEV. — **SAS Computer Performance Evaluation Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 6-8, RENO, NEVADA — **SAS Macro Language Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 7, CHICAGO — **Professional Communications.** Contact: Barry Reddington, Reddy Service, Inc.,

6150 W. Higgins, Chicago, Ill. 60630.

MARCH 7-8, RENO, NEV. — **SAS Report Writing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 7-8, HONG KONG — **Autotech: International Conference on Industrial Automation.** Contact: Hong Kong Productivity Centre, 12th Floor, World Commerce Centre, Harbour City, 11 Canton Road, Tsimshatsui, Kowloon, Hong Kong.

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EDITORIAL

Put AT&T ruling into perspective

Federal Communications Commission member Dennis Patrick said it best: Computer Decision II was based on a snapshot of the market. Today, five years after the decision was drafted, the background in that snapshot has changed radically.

Patrick's comment was made at a communications conference the day before the FCC formally proposed easing the restrictions on Computer Decision II. In particular, the FCC will scrutinize the rules requiring AT&T to maintain a separate subsidiary to market terminal equipment.

The question is, in reconsidering Computer Decision II, will the government risk reconstructing the monolith it so laboriously tore down?

A ground swell of change has been forming at the FCC for some time, as its procompetition Reagan appointees have watched AT&T's share of the terminal-equipment market steadily erode. (AT&T claims that the share of new sales garnered by its Information Systems unit has plummeted from 80% in 1980 to 30% last year).

On the surface, the FCC's reopening of the separate subsidiary debate, sparked by an AT&T petition, could have the long-term effect of adding competition to a market segment in which AT&T has clearly lost its monopoly. This in turn means lower prices for terminal equipment to end users, who in growing numbers are buying up communications hardware to construct their own voice and data networks.

It makes even more sense to reexamine and lengthen the confines of Computer Decision II when you consider the FCC drafted it years before the divestiture of AT&T and its Bell operating companies was conceived. AT&T's meager 1984 revenue (\$1.3 billion on \$33 billion in sales) shows plainly that the fruits of the company's monopoly have withered.

AT&T's competitors in the terminal-equipment market, as well as some end-user groups, have and will continue to insist that AT&T is just a sleeping giant, waiting to pounce on the competition with its gargantuan, omnipresent position in the installed equipment base.

It's not hard to argue that throwing out the separate subsidiary requirement would give AT&T a golden opportunity to use its communications service income as leverage for a crushing, competitive advantage in the equipment arena. But that ignores the fact that the FCC will, in the foreseeable future, maintain power of tariff review over AT&T.

In addition, should the FCC grant a waiver of separate subsidiary requirements to AT&T, it would most certainly have to do the same for the divested Bell operating companies. They, too, have obvious communications market presence and great production capabilities; as a group they out-earned AT&T three-to-one in 1984.

These arguments and counterarguments will mean little in the coming months because the deregulatory horses have left the barn. As FCC member Mimi Dawson recently put it, Computer Decision II is "in intensive care and the plug should be pulled."



LETTER

'Key' system offers licensing options

As one of the developers of the proposed Association of Data Processing Service Organizations (Adapso) Software Authorization system, I enjoyed the article "Response mixed to Adapso's software protection key" [CW, Jan. 21]. However, there are a few points that I would like to clarify.

Site licensing is not a technical issue but a marketing issue. However, the proposed "key" technology does offer the software vendor more options for site licensing. These issues were among several that prompted the initiation of this project, and the current proposal, still in draft form, deals with both.

One of the major concerns of software vendors in these two issues has been accurately controlling the number of copies put into use. By selling one

copy of the software with several copies of the key, both consumer and vendor can be satisfied with site and network licenses. The consumer avoids the need to purchase individual copies for each user, and the vendor is assured that payment is received for all product users.

Corporations are not resistant to copy protection. Rather, users are frustrated by having to insert encrypted diskettes into their machines and by the fear of an inadequate number of backup copies. Because the key can be left resident in the key ring permanently, the user never needs to take any special action to run a key-protected software product. Similarly, because the software is distributed on a standard diskette, there is no restriction on how many backup copies the user can make.

Simcha-Yitzchak Lerner
Cambridge, Mass.

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VIEWPOINT

Properly managed risk key to progress



THE DATA CENTER
John P. Murray

When one considers what might be called the "normal" issues associated with the management of the typical information processing department — the lack of adequate organizational understanding and support, recalcitrant information processing clients, a high degree of vulnerability in areas such as software failure and the myriad difficulties associated with managing independent and creative people — it can be seen that the mission of those charged with this function carries a great deal of risk.

When the issue of the rapid and dramatic pace of change in information processing technology is combined with the usual heavy degree of visibility its function carries in most organizations, it is easy to see that the degree of risk associated with the management of the information processing function is high and growing.

It appears that a number of information processing installations have tended to adopt a too conservative approach in dealing with change and the acceptance of risk associated with it. This seems to result from a feeling that moving aggressively to install and use various components of the developing information processing technology will only add to an already high risk factor.

Rather than acknowledge that there is already considerable risk inherent in the information processing function and then work to improve the management and control of that risk, many information processing managers tend to adopt a conservative approach, which in fact allows the risk factor to manage the installation.

This is not to suggest that adopting a "cavalier" approach to the management of the information processing function represents an acceptable man-

ner in which to operate. Not by any means. However, it should be recognized that by adopting a policy that follows an aggressive approach with regard to moving into new areas of information processing technology, the benefits to the entire organization can be so substantial that the acceptance of a reasonable increase in the information processing risk factor can often be justified by the potential benefits that can accrue from the assumption of that risk, provided sound management control exists.

Sound management key to low risk

Sound management is, of course, the key ingredient. In the absence of sound management, the degree of risk in any information processing department, regardless of its level of technology, will be high — probably too high in the final analysis. Good managers, on the other hand, should be able to competently handle a considerable degree of risk.

Not under consideration here is the issue of identifying and analyzing the various risks and making decisions about the acceptability of particular risks, as opposed to their anticipated benefits, except to state that there are methods that can be used to develop a risk/reward determination process. This process can be most helpful in developing specific criteria concerning particular risk situations to assess the practicality of the acceptance of a particular risk for a particular organization.

While the process for determining the risk/reward factor for any situation can be developed and can provide a clear picture of a particular action's probable outcome, such a process is of little value unless those who must make the ultimate decision about the acceptance of the risk are willing to pursue the required action. The primary issues must be whether or not the information processing department's management is willing to accept increased risk (provided that risk holds potential benefit) and, if accepted, how those risks will be managed.

Risk cannot be eliminated from the information processing function. However, it can and should be controlled and managed so that the tension produced by the assumption that a reasonable amount of risk can be effectively used as a catalyst for

change within the information processing department, as well as other areas of the organization.

The information processing department's management should work to help the information processing staff adopt an approach that will encourage the assessment of risk and the acceptance that a reasonable degree of risk is necessary to make progress. Playing it safe may indeed present a long-term hazard to the organization.

Examine system development methods

As an example, the method used to develop and manage application system projects should be closely examined to determine if any portions of that process can be changed or eliminated to speed up the development process without causing undue harm to the final product. Could fourth-generation programming languages be used to speed the process? Can some of the programming with fourth-generation languages be done by members of the client department requesting the project? Can the information processing clients accept increased responsibility for the testing of their new systems? Can they do more of their own system documentation?

A rather simplistic example perhaps, yet it is one to be considered when attempting to locate areas where the acceptance of some additional risk can be used to help move the information processing effort ahead.

An objective analysis can be made of both the inherent risk and reward in any information processing situation. Just as we should not consider risks deemed too high for our particular organization, neither should we back away from reasonable risk, provided the potential benefits justify the risk involved.

The pace in information processing continues to quicken. Information processing functions cannot remain static: If we do not move ahead, our functions will not stagnate, they will fall behind. Acceptance of risk assures some failures. As long as those failures are not spectacular — and we all know of examples of spectacular failures — we can learn from them, and in the long run, the organizations we attempt to serve will be better off.

The goal then must be not to avoid risk but effectively manage it to our advantage. ‡

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, published by Dow Jones-Irwin.

Determining need and use for a consultant



MANAGEMENT MATRIX
Walter F. Cuirle

Your stereo needs a new stylus, so you drop by the local store to pick one up. A gray-mustached fellow clad in a burgundy suit and white shoes tries to sell you a new cartridge; he's wearing a little plastic badge that reads "Audio Consultant."

You go to another store where you find the stylus, and while there, decide to pick up some tape for your videocassette recorder. The teenager behind the counter who handles the sale wears a little plastic badge that reads "Video Consultant."

Back in the office the next day, you open the mail and find a brochure from a "Computer Consul-

tant": just what you needed.

Maybe you've heard it said that consultants paint bull's-eyes over bullet holes. That's something of an exaggeration, but it certainly points out that the term "consultant" has been seriously devalued in recent years. Look in the Yellow Pages and you'll find kitchen consultants, travel consultants, home furnishing consultants — consultants in every conceivable area. What's next — consultant consultants?

A consultant can, in fact, provide valuable services for a DP operation in two areas: offering a different point of view on a current problem and performing as a resource to do specialized work that you otherwise would have to do personally.

Let's take an example. Suppose you have the go-ahead to purchase or design a major new piece of software. The sequence will be, roughly: write the specifications, send out the requests for proposal (RFP), evaluate the bids, select and install the system and convert to the system.

Specifications for a new system of-

ten start out as a compilation of wish lists from the departments that will be using it. It is often impossible to get all the wishes in and set priorities on them. An experienced outside point of view is useful here.

Help needed for RFP preparation

Preparing and sending out the RFP is an area where help is welcome and, unless you do a lot of it, is often unavailable in-house. Nobody likes to evaluate bids. It would be nice to have a liaison between you and the vendor representatives. It would be nicer still to have someone knowledgeable go through a 500-page proposal and boil it down to what you really want to know — "company A can do everything to your specifications for B dollars except items 10, 15 and 45. It will cost X, Y and Z extra to put those three features in." (There really ought to be a surcharge on word processors sold to marketing groups for use on proposals — it is getting to be technology run amok.)

All this implies two important qualifications you should look for in

a consultant. First, you want someone you can get along with and whose opinion you respect. Second, you want someone who is not beholden to a particular vendor; it is the attempt to conceal the sales motivation that is the real aggravation in dealing with the audio consultant and the video consultant. This may sound nebulous, personal and spreadsheet-resistant, but selecting a consultant is just like selecting any other professional — a doctor, a lawyer or an accountant. You're looking for a personal advisor, a temporary right hand, someone you can trust to think the way you do.

But so much for being nebulous and personal. Boot up your spreadsheet, pull up the budget figures and let's get impersonal and practical. Once you've found your advisor, how much should you pay? And more important, even though it may not seem to be of concern now, how do you end the affair?

Pay scale is determined by the job you need done. Take a good hard look

See **CONSULT** page 53

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

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VIEWPOINT

Agent arbitration effective in software escrow pacts



READER'S PLATFORM
Robert D. Sussin

Software escrow agreements are now commonly accepted as a vehicle by which software vendors can protect their proprietary source code while assuring their licensees continued product vitality. Software escrow agreements provide the licensee with access to the source code in the event of service or product discontinuance, bankruptcy or insolvency.

Despite the popularity of these arrangements, some have expressed reservations about the effectiveness of software escrows. Software escrow is seen as problematic for two reasons: Most software escrow agreements are not drafted to avoid the costs and delays associated with the resolution of disputes between vendor and licensee, and improperly drafted escrow agreements can be ignored by the vendor's bankruptcy trustee.

Most software escrow agreements are set up to allow an uncooperative vendor to impede the delivery of the source code to the licensee after the licensee has given the escrow agent notice of a triggering event. If the vendor takes issue with the licensee, a dispute results. The parties must resort to litigation or arbitration.

While arbitration is much more convenient and less costly than litigation, both alternatives are so costly and onerous the escrow agreement becomes practically worthless.

The simple yet effective solution to this dilemma is to provide, by mutual agreement, that the escrow agent will arbitrate the dispute over the entitlement of the licensee to the source code.

Speed advantage offered

This approach offers several advantages, the most obvious being the speed with which the dispute can be resolved because here the typical delay associated with the selection of the arbitrator is avoided. This is especially important to the licensee because he is typically in dire need of the source code prior to making the request. Escrow agent arbitration thus makes the escrow of practical value to the licensee.

However, escrow agent arbitration also serves the needs of the vendor because the vendor need not spend inordinate sums of money defending against the premature release of its valuable source code. Keep in mind that software escrow is appealing because it allows the vendor to assure the licensee that the software will be maintainable without giving up its source code. Thus, to the extent that licensee is assured that the arrangement will service his needs, the vendor benefits as well.

Another advantage of escrow agent arbitration is that the escrow agent already possesses the escrowed materials. This removes yet another complication and typical cause of delay. This arrangement has proven to be especially workable because the

escrow agent has no vested interest in favor of or against either party.

Another perceived problem with software escrow involves the bankruptcy trustee. For example, the article "Software escrow not a guarantee for protection" [CW, Nov. 19] lays out the perceived bankruptcy problem. It suggests that as long as the debtor retains any title to the property at the time of filing bankruptcy, the property belongs to the debtor's estate and may be recalled from the escrow agent by the bankruptcy trustee.

The article assumes that title to the escrowed materials must remain with the debtor (software vendor). This is understandable; most escrow agreements specify that title will re-

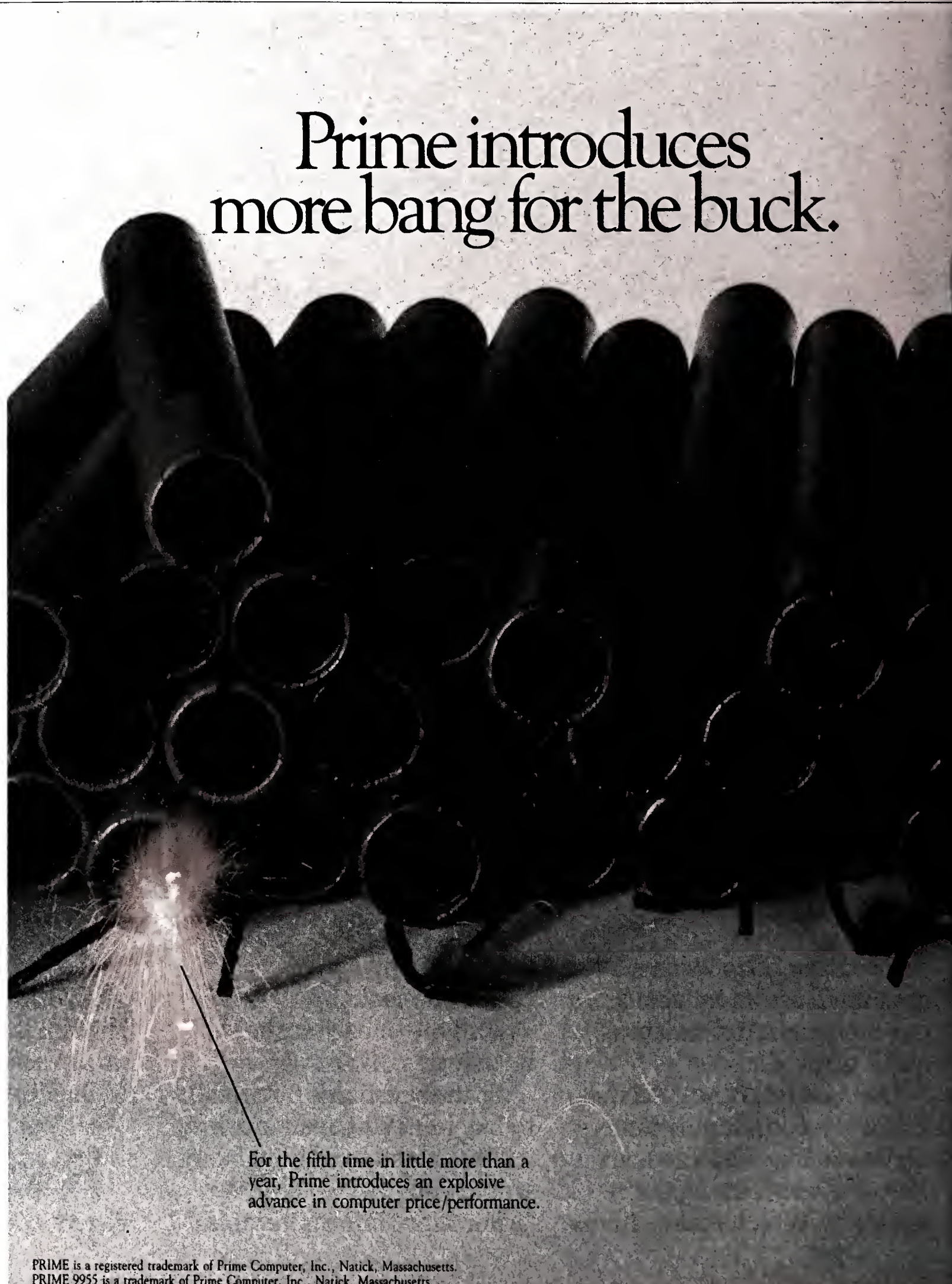
main with the vendor. This reflects a vendor concern that title in the underlying proprietary source code not be lost by virtue of the escrow.

Title transferred to escrow agent

The solution to this problem is to have your escrow agreement specify that title in the media be transferred on the execution of the agreement to the escrow agent. The escrow agent holds the media in trust for the licensee. Because the physical media here is no longer in the debtor's estate, the escrow is safe from the bankruptcy trustee.

With this arrangement, title in the underlying proprietary information remains with the vendor. This means

that if and when a triggering event occurs, the licensee gets the media with the underlying source code or other information with restrictions on the code use, as typically set forth in the license agreement between vendor and licensee. The restrictions prohibit the misuse of the proprietary information and thereby ensure that the vendor continues to have a secure proprietary position. The bankruptcy trustee retains the right to dispose of the underlying proprietary rights. However, as mentioned above, the trustee cannot touch the media because the escrow agent holds the legal title and possession. The licensee holds an equitable or beneficial interest. ‡



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Robert D. Sussin is president and general manager of Aegis Software Retention, Inc. in Los Angeles.

VIEWPOINT



LETTERS

Management skills urged

I want to commend *Computerworld* for the editorial "Managing productivity" [CW, Nov. 26]. We simply do not see enough written about managing systems projects at all levels.

This problem, as the editorial pointed out, persists, in spite of dramatic advances in hardware and software technologies.

After more than 30 years in this business, I am coming to the conclusion that our schools of higher learning are not equipping graduates with

the skills and knowledge essential to manage successful systems projects.

The continued emphasis on computer science propagates the technical solutions and not the management methods that are required for success. And, that large lump under the computer room carpet is the maintenance sweepings from poorly designed systems.

Patrick J. Maily
Lacey, Wash.

Contract breach warned

The article "A license to save on software" [CW, Nov. 19] detailed how costs were saved at North American Philips Corp. by licensing only one copy of a software package and then loading executable versions of it on other mainframes.

North American Philips may have reached this arrangement with the vendors of its financial packages, but others should be cautioned that moving an executable version of software that contains any vendor-supplied proprietary code without first obtaining a license from the software vendor can be a breach of contract. In my firm's case, a customer is licensed to use any portion of our proprietary software on one mainframe only.

The final executable version is constructed from and may contain proprietary code from more than one source, including the application; the vendor-supplied code referenced and used by the application; and any utility routines, such as I/O and mathematical services, usually supplied by the vendor supplying the compiler.

Louise B. Coutier
San Diego

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at that job. Now look at the various job descriptions of the people on your staff. Which of them could, in theory, do that job if relieved of present responsibilities? If the answer is you or a member of your senior staff, that's a good argument in favor of the necessity of the consultant. If it would require a combination of senior skills, that's a better argument. But if the answer is someone three levels down and four over in systems design, you may really need a contract programmer or some other type of temporary employee.

In any event, once you are able to formulate the job description, you also have an idea of the annual gross salary you would have to pay to get the job done in-house. This is your cost basis. Convert that annual gross to an hourly figure — because that's how most consultants charge — then figure in minimum overhead by doubling that figure. If you have better defined overhead factors, use them instead. The result is the ballpark, low-end hourly rate you can expect to pay, exclusive of expenses.

Be careful. It's a common and sometimes expensive mistake to pay a consultant on the basis of qualifications rather than product. If you were to hire a programmer to crank out Cobol code, not for a minute would you consider paying more than Cobol-cranking rates, even if the person had the qualifications of a senior systems analyst. The same principle applies to your consultant. Now, depending on the job, good qualifications can result in better productivity, and if this seems to be the case, you may want to up your estimate. But there's no point in paying extra for abilities you won't be using. If the price you are quoted still seems way out of line, either the job is incorrectly defined, you don't need a consultant or you don't need *this* consultant.

Find job's deliverable items

Now that you know the job and the rate, break up the job into definite closed items. Your goal at each point is to come up with something that can be delivered: a written set of specifications, a completed RFP, a written report on the bid evaluations. These items represent the advice for which you will be paying. You already know the rate, so you should be able to estimate the time needed for each item — you now have individual project cost ceilings. Set up your agreement with your consultant so that you can reevaluate the contract as each of these items is produced.

If the billings related to one of the items goes over the ceiling, or if your in-house situation changes, you already have perfect points on which to end your relationship with your consultant without arguments or rancor. This step-by-step, project-oriented approach also protects you from the cost overruns that are almost inevitable if you are paying an hourly rate and have an open-ended agreement.

Now that you have the cost estimates, time estimates and qualifications list, you are all set to find somebody to handle that job for you. More important, you can justify it to your superiors. There's just one more thing you need to remember — beware of consultants wearing plastic baggies. ‡

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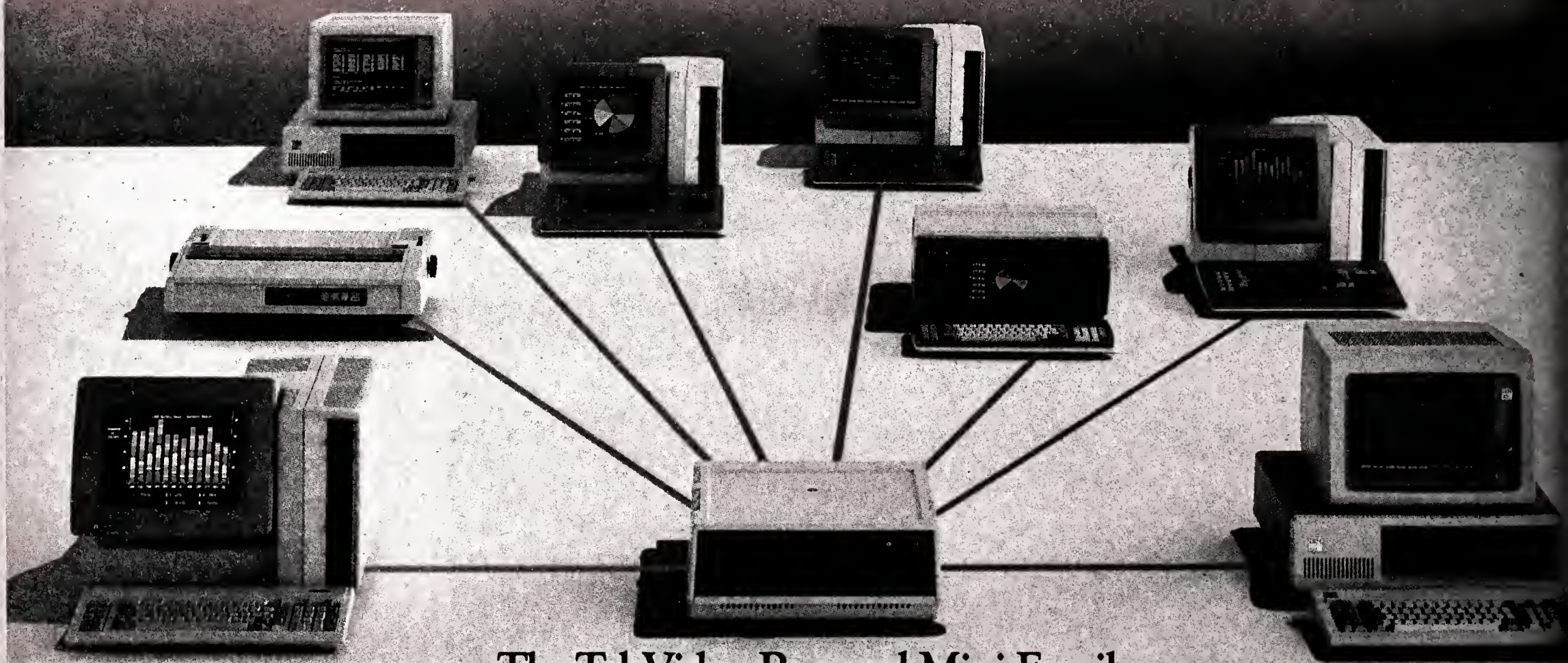
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SOFTWARE & SERVICES

Marines seek a few good tools

Service's DP branch puts software packages to test

By John Gallant
CW Staff

QUANTICO, Va. — The U.S. Marine Corps has earned a reputation for putting its recruits to the test. And just as the service's newcomers have to prove themselves before their superiors, third-party software packages must also show their mettle in order to become standard-issue Marine Corps systems.

At the Marine Corps Central Design and Programming Activity (CDPA) installation here, Marine DP staff members are responsible for reviewing, testing, approving and maintaining mainframe software used in the Corps' data centers around the world. The service maintains two other CDPA installations in Albany, Ga., and Kansas City, Mo., and software approved by the CDPA becomes part of the standard hardware and software configurations specified for the Marine data centers.

According to Donald Shifflett, assistant head of systems software, the Quantico CDPA is linked via the Marine Corps Data Network to the other CDPA's and to the service's four Regional Automated Service Centers in Hawaii, North Carolina, Cali-



Shifflett

U.S. Marine Corps photo

fornia and Okinawa. Three recently developed Deployable Force Automated Service Centers — mobile data centers designed to provide support for Marine units in the field — are also expected to become part of that network in the near future (see related story page 63).

See **MARINE** page 62



SOFTALK
John Gallant
CW Senior Editor

A niche that's yet to be filled

While at a conference or a trade show, one phrase you cannot avoid if you read product literature, listen in on the conversations of the species *high-techus* or sit through conference sessions is the ubiquitous "market niche."

The listener is soberly informed that Company X, once merely a spectator to the dramas unfolding in a particular market niche, now intends to invade that niche vigorously. Or the reader is reminded that to succeed, Product Y must be targeted solely to another specific market niche or the ill winds of business fate will drive the product toward the rocky corporate shoals, where it will founder. Similarly, the conference attendee is told that Emerging Technology X must break the shackles of the market niche that confines it if that technology is to achieve all that it is destined to achieve.

With all the attention to market niches, one would think that by now some enterprising individual would have addressed one niche that heretofore has been roundly ignored. There seems to be a vast, unfulfilled need among trade show visitors for a handy manual filled with advice on how to make optimal use of one's time while at such a conference.

Nonsense, you say. Tips on attending a trade show? What, you ask, could be easier? You simply pack up the garment bag, check into that nondescript hotel in Anytown, U.S.A., go to a couple of sessions, stop by a few booths, have a nice dinner and head home two or three days later. Piece of cake, you conclude. How, you ponder, can there be a real market niche for such a conference manual if even the trade show visitor does not see

See **SHOW** page 58

■ An executive information system dubbed Command Center was unveiled by Pilot Executive Software, Inc./**63**

■ Perkin-Elmer Corp. announced a series of software products headlined by the release of a multi-processor version of its Reliance Plus data base management system/**64**

■ Data General Corp. announced software products, including an enhanced version of DG/SQL, aimed at improving the performance of its superminis/**65**

■ SAS Institute, Inc. introduced a version of its SAS System for IBM's VM/PC environment/**66**

SOFTLINE/STEVEN PFRENZINGER

Productivity aids revitalizing Cobol

An interesting thing is occurring in the world of applications development for IBM's IMS DB/DC, and CICS/DL/1; Cobol is shedding its tarnished image. Rather than dying in the productivity tool revolution, it has

Pfrenzinger is president of IMS Consulting, Inc., an Encino, Calif.-based consulting firm that specializes in IBM's IMS DB/DC and CICS/DL/1. He has 15 years of data processing experience and is a regular contributor to Softline.

become the foundation in the evolution of traditional IMS development.

There are many reasons for this revival, and a few are worth looking at, such as the following:

■ No programming language has been able to replace Cobol adequately.

■ Most Cobol programmers have resisted the anti-Cobol movement.

■ IBM has added significant improvements to its release of VS Cobol II.

■ IMS productivity tools have enhanced Cobol with powerful new com-

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SOFTWARE & SERVICES

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mands and features.

Because of the semantics problem in the computer industry, it is appropriate to define a few terms as used in this discussion. I have used the term IMS here to reference IMS DB/DC and CICS/DL/1 environments. The term IMS productivity tools (rather than fourth-generation languages or application generators) is used to describe a whole group of new tools that are used by programmers in the development center to build predefined production IMS applications.

I have used the term programming languages to describe languages that are used to define procedural logic. They include the basic IF-THEN-ELSE (conditional tests), PROCESS (moves, calculations, etc.) and DO-

WHILE (looping) constructs that are at the heart of all of the IMS productivity tools available today.

Other features for screen painting, prototyping, simplifying DB/DC interfaces and creating blocks of reusable code are all components of IMS productivity tools that are wrapped around some programming language. For example, IBM's Application Development Facility uses the Audit Language, Informatics General Corp.'s Mark V application development tool uses application-specific logic "requests", CGI Systems, Inc.'s Pacbase uses the Pacbase language and Sage Systems, Inc.'s APS/IMS uses structured Cobol.

Reasons for renaissance

Let us look closely at the four major reasons for Cobol's renaissance. First, the fact that no pro-

gramming languages have come along to replace Cobol adequately is nothing new. The shortcomings of other languages are substantial and have included performance penalties, reduced functionality and restrictive architectures. These and other shortcomings have meant that no one language can be used in all situations. You could buy numerous new programming languages, most imbedded within a productivity tool, to get the benefits of their individual strengths, but learning numerous new languages is not practical; experience is proving this point.

Different languages are workable between the development center and the user-oriented information center, but within each center, the use of numerous languages can cause problems, such as learning curves and redundant features. This is usually

less of a problem in the information center.

Second, resistance to IMS productivity tools and their associated programming languages is greater than most managers will admit. A small percentage of programmers have received these new tools enthusiastically. But only when the majority accept the use of tools can any DP department expect to gain the increased productivity necessary to address applications backlogs.

The "edict-from-the-boss" approach to force the use of IMS productivity tools in the development center has met with only limited success. Not surprisingly, DP managers will have a better chance to get a large percentage of Cobol programmers to accept an IMS productivity tool that has Cobol as its programming language.

Third, while slow in coming, the new release of VS Cobol II is finally on the horizon, and the improvements are significant. Probably not enough to quiet those who are ardently against Cobol but enough to show that Cobol can be enhanced to improve productivity during development and maintenance.

These new enhancements include a PERFORM statement variation for in-line looping without GOTOs, the new EVALUATE/WHEN statement combination for complex conditional tests in a case structure, the INITIALIZE and SET statements to assign values to data items and conditional variables, a batch debugging tool; formatted dumps and improved compiler listings.

Lastly, the fact that Cobol can be enhanced is not news to the numerous software vendors marketing IMS productivity tools that are wrapped around it. These vendors have recognized that Cobol is a good programming language for procedural logic requirements and that its use can be enhanced with various complimentary commands and features. These enhancements are numerous, and several are worth discussing.

Cobol enhancements

■ Screen painters make a simple task of one of the more difficult aspects of on-line programming. The days of coding and maintaining native message format services or basic mapping support screen definitions are definitely over. These painters are easy to use and involve painting one image of the screen, showing literals (screen and field labels) and variables (I/O fields). Then, for each variable, attribute and field-editing logic are specified. This field-edit logic is usually defined in a nonprocedural fashion through such things as numeric ranges, edit masks and table lookups.

■ Prototyping features make it easy to demonstrate a working model of the system to the user. The important word here is easy. While early prototyping is generally accepted as a good way to validate user requirements, actually doing it is still a rarity because the mechanics of prototyping have been difficult and time-consuming.

■ A command or macro-like facility allows for blocks of reusable code to be inserted into Cobol programs during a precompile process. The block of reusable code can be built by senior developers to blueprint common functions within a system or installation. This facility should increase productivity.

See COBOL page 58

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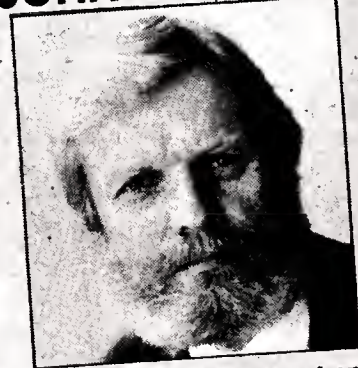
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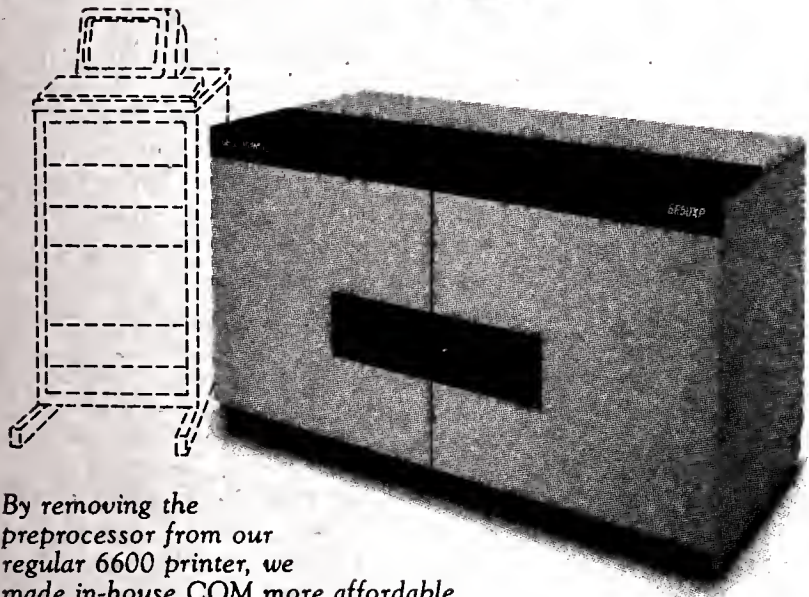
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SOFTWARE & SERVICES

SHOW from page 55
the need for one?

But consider a few important points. If you are an average DP or MIS professional, you are probably called on to attend anywhere from two to 10 industrywide conferences (Comdex, National Computer Conference), user group meetings (fill in the blank) or technology-specific shows (Uniforum, Siggraph) each year.

Each trip chews up a goodly chunk of time, which is no doubt one of your most valuable assets, considering all those tasks vying for your attention. Too often, if you recall, you return back to the office bleary-eyed and exhausted, sore-fisted from the handshaking onslaught of smiling vendors and straining under a load of product kits and giveaways. To your dismay, you also find that

you have learned little and have gained few insights into new technology or products.

It does not have to be that way. Ostensibly you plan, or are ordered, to attend a trade show for a reason — to keep up with the changing forces of the industry and to glean some knowledge that can make you more adept at juggling your responsibilities.

Enter the conference manual. To begin with, such a guide would be a great help in planning just which shows to attend. For example, does the conference offer sessions really geared to your needs and level of expertise, or are the sessions just broad overviews with titles such as "Strategic Planning for Successful Technology Integration" or techie get-togethers such as "Making Better Use of the Grep Command"?

The manual would also offer tips on evaluating speakers. It might offer suggestions to help you divine the speakers who have a real working knowledge of a technology or a specific industry and weed out those who peddle the same tired oratorical wares conference after conference.

Avoiding the hype

The book would inform you, for example, that you should leap at the chance to attend sessions where users relate their experiences with a particular product. These sessions give you a chance to avoid the marketing hype and cliches and can provide the answer to the question you most want to ask — how does this thing work in the real world?

Also, and no less important, the manual would give you some stars by which to navigate more safely the

sprawling conference floor dotted with vendor booths. It would help you formulate the questions you really want to ask to help you avoid spending fruitless time in those fancy booths. The manual would also teach you how to read product literature to determine whether the product is new or significantly enhanced or just reintroduced or on display.

In the absence of such a manual, you can make time spent at a conference worthwhile. Take the time to review the conference agenda, research sessions and speakers, map out vendors you want to visit and make a point of seeking out users and picking their minds. That way, you can make a conference visit not only a nice break from the office but also a valuable tool for advancing your career. Fill that market niche by yourself.

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COBOL

from page 56

clude the capability to modify the block of code as it is inserted into the main program. These modifications are usually specified by parameters passed when the commands are invoked. This feature keeps the maintenance link from being broken. The maintenance link is important because modifications in the blocks of reusable code must be easily implemented across the entire system. Without this link, you accomplish no more than a simple statement-include feature.

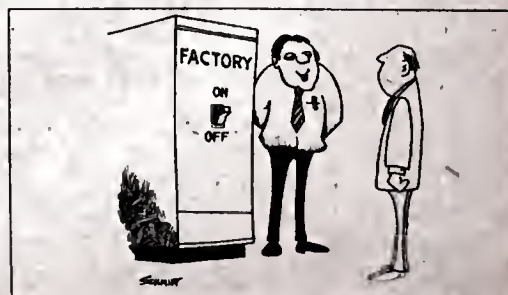
■ Special commands have been added to simplify the DB/DC interfaces. These commands are imbedded in a Cobol program and expanded during the precompiler process into the appropriate native DB/DC code. One of the most difficult tasks in on-line programming is the native coding for screen handling and data base access. These commands allow for less experienced programmers to become productive much sooner.

Precompiler concept

An interesting feature of the precompiler concept is that it can be used to enforce structured programming concepts. This results in consistent, well-structured Cobol programs that are much easier to debug and maintain.

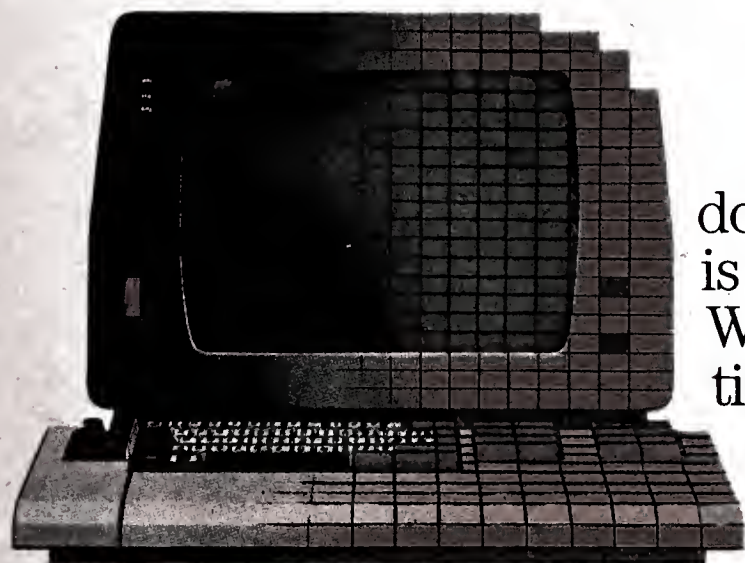
In addition to IMS productivity tools, look for the development of tools that aid in program design, analysis and documentation. With the power of this new category of productivity tools added to that already available from tools for development, Cobol will become less of a target of controversy.

As for the long-term future of Cobol and IMS development, Cobol may eventually be replaced with a more powerful language that is easier to use, but the change will happen in a slow evolutionary process taking 10 to 15 years. The IMS productivity tools that use Cobol are becoming the "bridge" products for which most traditional IMS DB/DC and CICS/DL/I shops have been looking.



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SOFTWARE & SERVICES

MARINE from page 55

Shifflett said an NCR Comten, Inc. processor serves as the Quantico CDPA's front end to the network. The installation runs two Amdahl Corp. 470V/7 mainframes under IBM's MVS Version 1.3.2. A bank of more than 90 Memorex Corp. 3650 and IBM 3380 hard disk drives provides nearly 34G bytes of storage, and 25 tape drives are available for tasks such as archiving.

An extensive selection of third-party software packages is in use at the Quantico CDPA and the service's other data centers because, Shifflett explained, the Marine Corps has found that many off-the-shelf products offer a viable alternative to in-house development projects.

"We advertise in the *Congressional Business Daily* for a particular

type of software," he said. "We outline what the minimum requirements for the package are and what we expect it to be able to do. We then do a technical review of the submitted products' documentation. On the basis of that, we select one or more of the packages and install and test them on our computers. Finally, we will make a recommendation to Marine Corps headquarters as to which package should become the service standard."

Among the products the Quantico CDPA has acquired are Candle Corp.'s Omegamon performance management system, Uccel Corp.'s UCC-1 tape management software, IBM's TSO and Network Communications Control Facility, Applied Data Research, Inc.'s Roscoe remote job entry system and Software AG of North America, Inc.'s Adabas data base

management system (DBMS), Natural application development language and Complete teleprocessing monitor.

In addition to reviewing software for possible adoption as a service standard, Shifflett said, each CDPA is responsible for designing, programming and exporting in load modules to other data centers certain Class 1, or top-priority applications, such as logistics, payroll and manpower software. The Quantico CDPA also provides computing services to Marine Corps headquarters and supports the service's Computer Science School. The Quantico CDPA currently boasts about 350 DP employees.

Currently, the Quantico CDPA is in the final stages of approving an access control security system to be used in all data centers. Shifflett said the service's review of that software

was prompted by a directive from the commandant of the Marine Corps ordering security to be tightened at the Corps' DP facilities.

As the initial phase of the approval process, Shifflett said, CDPA staffers drew up the minimum requirements for an acceptable access control package. The requirements were as follows: a facility to allow security administrators to establish access rules; user-entry and data set access controls; immediate display of warning messages for security violations detected; reports showing users who have accessed system resources and individual data sets; rule violations and modifications to data sets; capabilities for tracking specific users and resources; and minimal resource consumption.

Of the vendor-submitted packages, four were selected by the CDPA for extensive documentation review and in-house testing. The initial pool of four candidates was quickly narrowed by half because, Shifflett said, two of the packages exhibited problems ranging from difficult installation to poor technical support. The third package, which fulfilled all the criteria, was rejected because it required too many hooks into the host system, he said.

The remaining prospect, CGA Software Products, Inc.'s Top Secret, was recommended for prolonged production testing and, based on its success in a production environment, is now in the process of being approved as the Marine Corps' standard access control package.

"Top Secret offered us a multi-phased implementation scheme, which we were looking for," Shifflett said. "We wanted the ability to have only certain resources and users protected at each step in the phased implementation. We did not want to be required to have everyone defined to the system on Monday morning."

In production use, Shifflett said, Top Secret has reduced resource consumption and has helped the CDPA save on Dasd usage. In addition, the package has kept adventurous Computer Science School students from accessing nonschool data on the system.

"There is one big benefit from Top Secret that is hard to measure, and that is resource savings," he said. "It stops browsing, the situation where one employee has nothing to do and begins to look at other data sets, other files. We are CPU and I/O constrained, and when one guy starts doing that, it slows everybody else down."

"Top Secret has saved us in terms of Dasd in that we have discouraged what we call pirating," Shifflett continued. "People would import a Cobol procedure, modify it to what they wanted and save it in their own little library. That does not happen anymore."

But above all, Shifflett said, the security package has given systems administrators just that — a feeling of security.

"We can go home feeling safe," he said. "If you are a systems programmer, you are always worried that somebody will accidentally scratch data sets that are critical to the execution of the system. With the protection we have now, we can go home [knowing] that nobody will scratch one of those critical data sets. That way we know that someone is not going to bring the system down or prevent it from coming up next time."



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SOFTWARE & SERVICES

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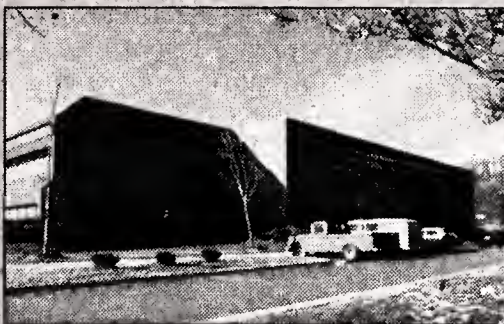
"Join the Navy and see the world!" For years, that U.S. Navy slogan enticed recruits with visions of opportunity and adventure. But today, the U.S. Marine Corps is adding a new twist to the slogan. The Marines are now giving selected third-party software packages a chance to see the world.

According to Donald Shifflett, assistant head of systems software at the service's Central Design and Programming Activity (CDPA) in Quantico, Va., certain Marine Corps-approved software packages will soon be traveling with Marine divisions

deployed around the globe.

The packages, selected as Marine Corps standard software by the service's CDPA, are currently being installed in three recently completed Deployable Building housing CDPA, Quantico, Va.

Force Automated Service Centers that are designed to provide field DP support when the three major Marine divisions leave



Marine Corps photo

their bases in California, North Carolina and Okinawa, Japan.

Shifflett described the service centers as mobile DP centers. Housed in two adjoining trailers, each service center is equipped with an

IBM 4341 mainframe with 4M bytes of main storage, six IBM or IBM-compatible hard disk drives, four tape

drives and an IBM 3705 front-end communications processor. In addition, the mobile units are fitted with service-standard software packages running under IBM's MVS operating system. The service centers will soon be tied to the Marine Corps' major DP centers around the world.

"The [service center's] mission is to support forces in the field," Shifflett said. "When one of the divisions moves out, the trailers will be loaded into a C-141 [cargo plane], and when the Marines establish a beachhead, they will be installed there."

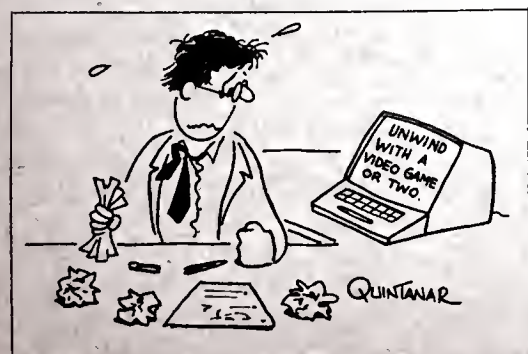
Pilot offers Command Center system

BOSTON — Pilot Executive Software, Inc. has introduced its Command Center executive information system.

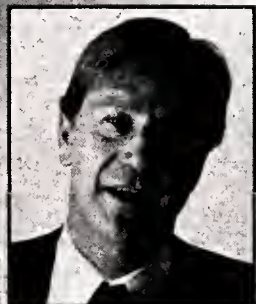
According to a company representative, Command Center software resides on a Digital Equipment Corp. VAX series processor and any number of IBM Personal Computers. The software allows the user to review, track and control information and display it in graphics or tabular form. Command Center enables the user to extract, filter and compress data as needed. In addition, the software can alert the user to variances from budgets, benchmarks or user-determined expectations and can monitor performance based on so-called critical success factors.

Extracted data is reportedly maintained on the host and can be downloaded to the micro. The user can manipulate the data using host resources and can use the micro for tasks such as full screen editing, local storage and graphics. Command Center features a data import facility that lets a user extract data from any number of external or internal data bases and file structures and load that information into a dedicated data base. The product also offers embedded routines that can be used for statistical and graphical analysis. An end user can interact with Command Center via a mouse interface, a touch screen or a keyboard to receive summary report formats covering a broad range of management information. The user can specify menus to access internal information from corporate data bases as well as data from external sources.

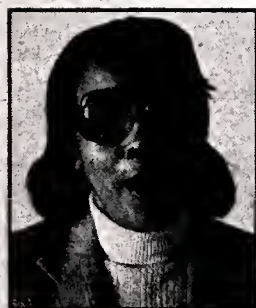
Command Center costs \$75,000 from Pilot Executive Software, 40 Broad St., Boston, Mass. 02109.



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SOFTWARE & SERVICES

PE introduces multiprocessor version of its DBMS

OCEANPORT, N.J. — In conjunction with the announcement of its 3260MPS multiprocessor supermini-computer, Perkin-Elmer Corp. also unveiled a multiprocessor version of its Reliance Plus transaction processing and data base management system (DBMS).

A PE spokesman said the Reliance Star software, an

optional component to Reliance Plus, supports a back-end data base processor and up to eight front-end transaction processors. The front ends control terminal and data communications, in addition to running applications software, allowing the back end to execute data base requests.

The design reportedly in-

creases the processing power available to Reliance Plus users and enables DBMS processing to operate in parallel with one or more front-end transaction processors. The spokesman said the increase in power allows more transactions to be run in a specified time period than with a single processor system.

The spokesman said Reli-

ance Star configurations can begin with a two-processor system to which additional front-end processors can be added as data base and transaction processing demand increases. Any single PE processor Model 3210, 3230, 3250XP or 3200MPS system running Reliance Plus can be expanded to a Reliance Star system without modification

to existing applications.

Updated cost for Reliance Plus

As an option to Reliance Plus, Reliance Star is priced at \$5,000 for an initial fee, and additional copies are priced at \$2,000 each. PE also announced updated pricing for Reliance Plus. Pricing for the DBMS ranges from \$3,000 to \$24,000, depending on the host processor, and additional copies are priced between \$2,000 and \$9,600.

In addition to the introduction of Reliance Star, PE announced four enhancements and two new software packages for Reliance Plus. They are as follows:

- The Reliance Plus Cobol Productivity Aid enhancement. This enhancement is said to extract information from the Reliance Plus DBMS data dictionary and screen form library and automatically create the data division for Cobol programs to improve development productivity and enhance program maintenance.

- A Source Librarian utility enhancement for Reliance Plus. This feature allows a user to maintain a suite of source programs in a secure environment with version and revision control. It provides centralized control of source code to improve disk storage utilization.

- A C language interface enhancement for Reliance Plus. This enhancement gives C programmers access to DBMS facilities formerly available only to Cobol and Fortran programmers.

- The Immediate Reliance facility enhancement for Reliance Plus. This is said to automate the installation, definition and upgrading of Reliance Plus systems. Users only have to define essential parameters, such as a name, for the DBMS system and select disks, terminals and printers to be used.

These four enhancements are included in the updated pricing for Reliance Plus.

- The Reliance Update System (RUS/32), which was described as an option to the Reliance Plus DBMS. It allows individual records within a data base to be created, modified or deleted without special programming. It supports complex data views and data validation and is priced from \$800 to \$4,000.

- Reporter/32, which is said to be an option to Reliance Plus and allows for the simplified definition of reports. The product uses the interactive terminal facilities of the DBMS and lets users specify and test reports without conventional programming techniques. The price of Reporter/32 is from \$1,000 and \$5,000.

PE is located at 2 Crescent Place, Oceanport, N.J. 07757.

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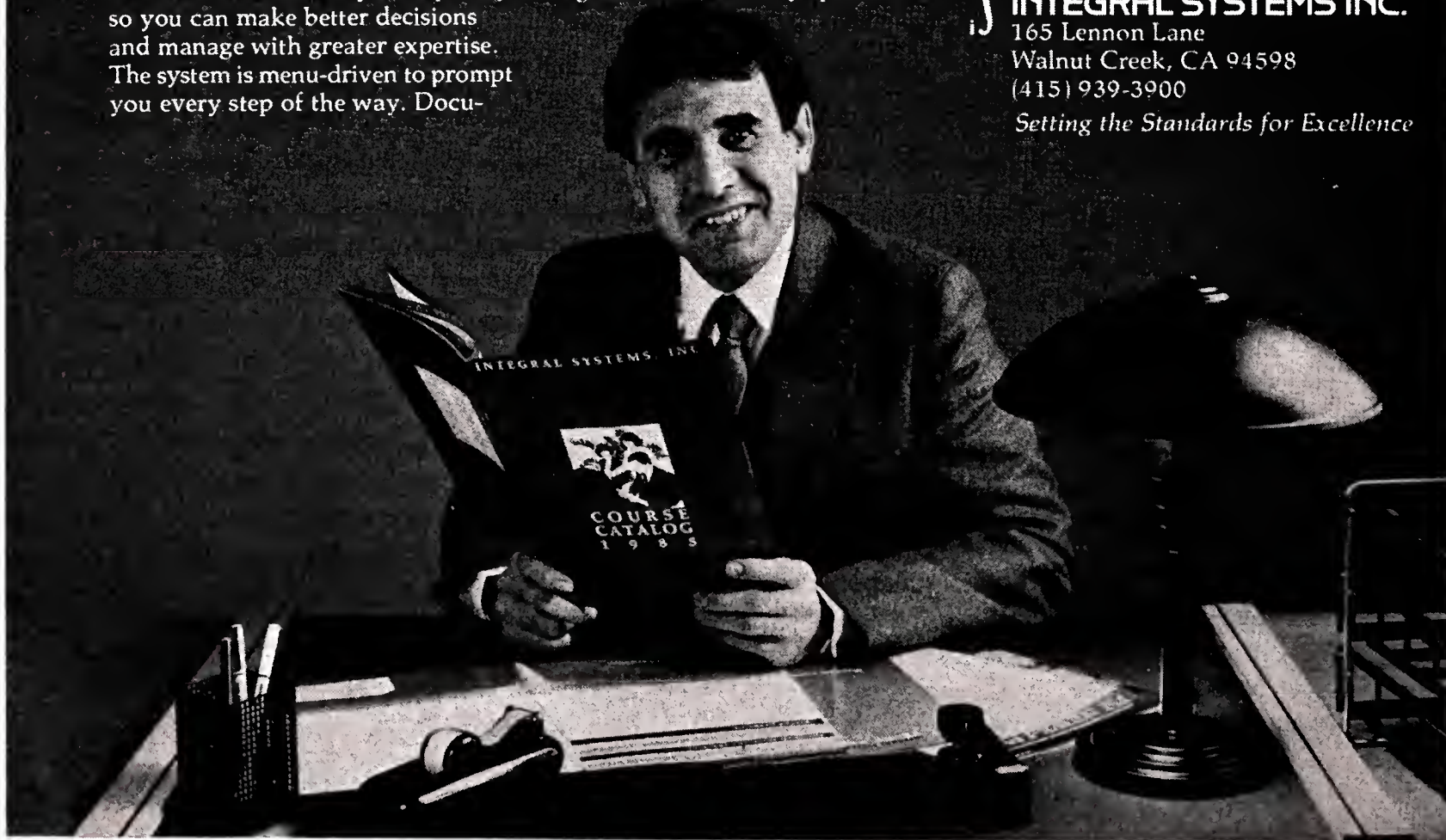
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SOFTWARE & SERVICES

DG enhances MV supermini series with software

WESTBORO, Mass. — Data General Corp. has introduced a set of software products aimed at enhancing the performance of the company's MV series of superminicomputers.

DG's Revision 2.0 of its DG/SQL relational data base management system is said to process up to five times as many transactions per second than the previous version. According to a spokesman, Revision 2.0 is also said to alter the memory overhead requirements for running DG/SQL. Under Revision 2.0, 2M bytes of main memory are required to support one user of the package. Each additional 1M byte of memory can support up to six users — twice as many as previously supported.

Other enhancements in Revision 2.0 include a reduction in the amount of time required to open a data base file, the spokesman said. Also, Revision 2.0 is said to reduce the disk space needed to store

certain files, and the enhanced version also includes call-level interfaces for Fortran 77, PL/I, C, Pascal, Basic and Cobol programming languages.

Revision 2.0 is a no-charge upgrade for current DG/SQL users. The initial license fee for a new user is \$20,000, the spokesman said.

Language compiler

DG also announced a language compiler, Global Optimizer, said to improve the performance of programs written in Pascal, C, Basic, PL/I, Cobol and Fortran 77 by up to 50%. The Global Optimizer reportedly scans programs for predefined code patterns and replaces those patterns with shorter program segments. The Global Optimizer is available as a no-charge option to current users of DG's AOS/VS operating system versions of Basic, C, Cobol, Pascal, PL/I and Fortran 77 compilers.

DG also enhanced its Cobol-77 compiler to include two data types said to improve the compiler's ability to address conditional statements. The compiler was improved to provide closer compatibility with non-DG Fortran, such as the Fortran compiler developed for use with Digital Equipment Corp. VAX series processors.

The Cobol-77 compiler enhancements are a no-charge option for current MV users with DG maintenance contracts.

Also introduced was an enhanced microcoded decimal instruction set for Eclipse MV series processors that is said to accelerate Cobol execution by up to 30%. The enhancement consists of four instructions that reside in the standard microcode space in the Eclipse MV series processors.

For more information, Data General is headquartered at 4400 Computer Drive, Westboro, Mass. 01580.

MIS/OL tool gets manuals

OAK BROOK, Ill. — Pansophic Systems, Inc. has added new utility and programming manuals to Version 8.1 of MIS/OL, its on-line transaction development tool for IBM's CICS environment.

According to a spokesman, the enhanced version allows for an increased number — from 16 to 32 — of active MIS/OL tasks. The Init function in the product's batch mode has been extended to allow more than one set of 10 MIS/OL files to be initialized for update within the same transaction. Version 8.1's other enhancements include improved link and transfer control between MIS/OL and non-MIS/OL applications.

The product is priced at \$29,000 for IBM's DOS operating system and \$35,000 for IBM's OS operating system.

Pansophic Systems is located at 709 Enterprise Drive, Oak Brook, Ill. 60521.

DOD validates Ada compiler

WALTHAM, Mass. — Softech, Inc. has announced that its Ada language compiler has been validated by the Department of Defense.

According to the vendor, the compiler is part of the company's Ada Language System (ALS), a programming support environment that consists of 74 software tools including a linker, a debugger, performance analyzers, configuration management and data base maintenance facilities.

ALS runs on Digital Equipment Corp.'s VAX-11/780 under the VMS operating system. The entire ALS has completed the Army's Formal Qualification Testing, and official validation of the ALS compiler came from the DOD's Ada Joint Program Office.

ALS, including the Ada compiler and a source code license, is priced at \$50,000. The system, including compiler and an object-code-only license, is priced at \$20,000, according to Softech.

Softech is located at 460 Totten Pond Road, Waltham, Mass. 02254.

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SOFTWARE & SERVICES

SAS offers software for IBM micros

SAS System under VM/PC requires minimal mainframe tie-in

CARY, N.C. — SAS Institute, Inc. has announced a version of its SAS System running under IBM's VM/PC operating system. The system includes SAS, SAS/Full Screen Product (FSP), SAS/Econometric and Time Series Library (ETS) and SAS/Operations Research (OR) running on the IBM Personal Computer AT/370 and Personal Computer XT/370.

The SAS System under VM/PC is said to provide the full range of SAS System procedures with minimal mainframe tie-in. Reportedly, it enables users to create and run SAS jobs locally, sharing programs with other

XT/370 users via floppy disk, or conducting simultaneous micro-mainframe sessions.

A menu screen called Sassetup is used to download the SAS System in portions to the XT/370.

All features of the mainframe SAS System under IBM's CMS are said to be included under VM/PC, including SAS Display Manager System, the macro facility and Version 5 enhancements.

The base SAS software is used for data management, statistical analysis and report writing; SAS/FSP features full screen data entry, query

and letter writing capability; FSP/OR is an operations research tool used to schedule projects, mix projects and plan transportation; and SAS/ETS is an econometric time-series modeling program.

The first-year corporate fee for base SAS software under VM/PC is \$2,500 for 50 workstations, and each additional software product can be licensed at fees ranging from \$2,000 to \$2,500 for 50 workstations, the company said.

SAS Institute can be contacted at Box 8000, SAS Circle, Cary, N.C. 27511.

Soft-Switch bridge allows Disoss links

KING OF PRUSSIA, Pa. — Soft-Switch, Inc. has introduced a software bridge that links IBM's Distributed Office Support System (Disoss) to the company's Soft-Switch electronic document transfer system for IBM mainframes under IBM's MVS or VM operating systems.

A spokesman described Soft-Switch as a document control system that provides translation, distribution and library services. It provides document interchange facilities for a variety of word processors, microcomputers and IBM host-based terminals.

Translation services convert the text format codes of a document created on one machine and provide for the transfer of the document to a recipient machine.

The Soft-Switch Disoss bridge provides transparent document distribution between Soft-Switch and Disoss users. It also provides a link to office systems from Wang Laboratories, Inc., Xerox Corp. and Multimate International Corp.'s word processing packages. Disoss users can send revisable text documents to users on non-IBM systems, and non-IBM users can send similar documents to users on a Disoss network.

Systems supported by Soft-Switch include: Wang's WPS, OIS and VS environments; IBM's Displaywriter, 6640 and 6670 laser printers, Document Composition Facility and Profs; and the Xerox 860 word processor.

The Disoss bridge sells for \$20,000. Soft-Switch is located at 200 N. Warner Road, King of Prussia, Pa. 19406.

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SYSTEMS SOFTWARE

■ Pansophic Systems, Inc. has released Version 10.4 of its Panvalet Interactive System Productivity Facility (ISPF) on-line editor, said to be an interface between the Panvalet library and IBM's ISPF environment. The product runs on IBM and compatible mainframes under IBM's MVS operating system.

A spokesman said Version 10.4 enhancements include the following: support for Version 2 of IBM's ISPF/Program Development Facility product; menus, tutorials and messages in ISPF's new format; the ability to enter the entire 10-char. Panvalet member name on all Edit primary commands; and the ability to invoke functions such as Copy, Move and Create from user-written macros.

Panvalet ISPF 10.4 costs \$15,000.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

■ Fel Computing has introduced a software system that integrates Digital Equipment Corp.'s VAX-11, Decsystem-10 and Decsystem-20 host machines with the IBM Personal Computer and other microcomputers running Digital Research, Inc.'s CP/M and Microsoft Corp.'s

Continued on page 68

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For more information call or write Infodata Systems Inc., 5205 Leesburg Pike, Falls Church, Virginia 22041. (800) 336-4939. In Virginia and Canada call (703) 578-3430. Telex 899125.

European agents: Software Engineering Benelux Inc., The Netherlands, Telex 84431117; Thorn EMI Computer Software, U.K., Telex 851858015.

INFODATA®

SOFTWARE & SERVICES

Continued from page 66

MS-DOS operating systems.

According to the vendor, Mobius users can access host devices and run host programs as though they were resident on the microcomputer. Mobius includes an Instant Terminal Emulation feature that can be used while a micro application program is running. The product uses the asynchronous Ascii communications port of the microcomputer.

Prices range from \$3,500 for five users up to \$17,000 for 50 users. Micro Mobius software is priced at \$250.

Fel Computing, P.O. Box 200, East Dover, Vt. 05341.

■ **Kolinar Corp.** has announced an interactive debugger that tests and monitors programs running under IBM's VM/CMS operating systems.

A representative said Xdebug uses Kolinar's Xmenu/E full screen management system to create an interactive test environment using CMS-compatible commands. It installs without modification to IBM's CMS or CP. While debugging, users can issue any CP or CMS command, define and use symbolic variables and browse external CMS files.

The product is said to support IBM 3270 terminals in native mode. Xdebug will also support basic assembler language. The annual license fee for Xdebug and its source code is \$3,600 with an additional one-time license fee of \$1,800.

Kolinar, 3064 Scott Blvd., Santa Clara, Calif. 95054.



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■ **Applied Data Research, Inc. (ADR)** has announced Release 3.4 of ADR/The Librarian said to provide support for IBM's VM/CMS environments.

Interactive VM/CMS users can now use features including Source statement archiving, Libaudit and advanced file organization. No VM or CMS system modifications are needed. The Librarian/CMS-ISPF Interface is said to provide integrated capabilities for program develop-

ment under IBM's CMS, DOS/VSE and MVS.

All services are invoked using either CMS line-oriented commands or ISPF-compatible panels and menus. An audit trail of source program activity can be maintained in the VM/CMS environment. The Librarian/SPF-TSO interface has two added functions, Libedit and Librowse. Libedit is said to integrate the Libget command, ISPF/PDF Edit function and the ability to modify a program

stored on a Librarian master file into an operation that appears to occur in memory.

The Librarian/Immediate On-line Update has been enhanced to provide discrete module queuing from any on-line system.

The permanent license fee for The Librarian begins at \$18,000 for DOS and \$27,200 for OS environments, the vendor said.

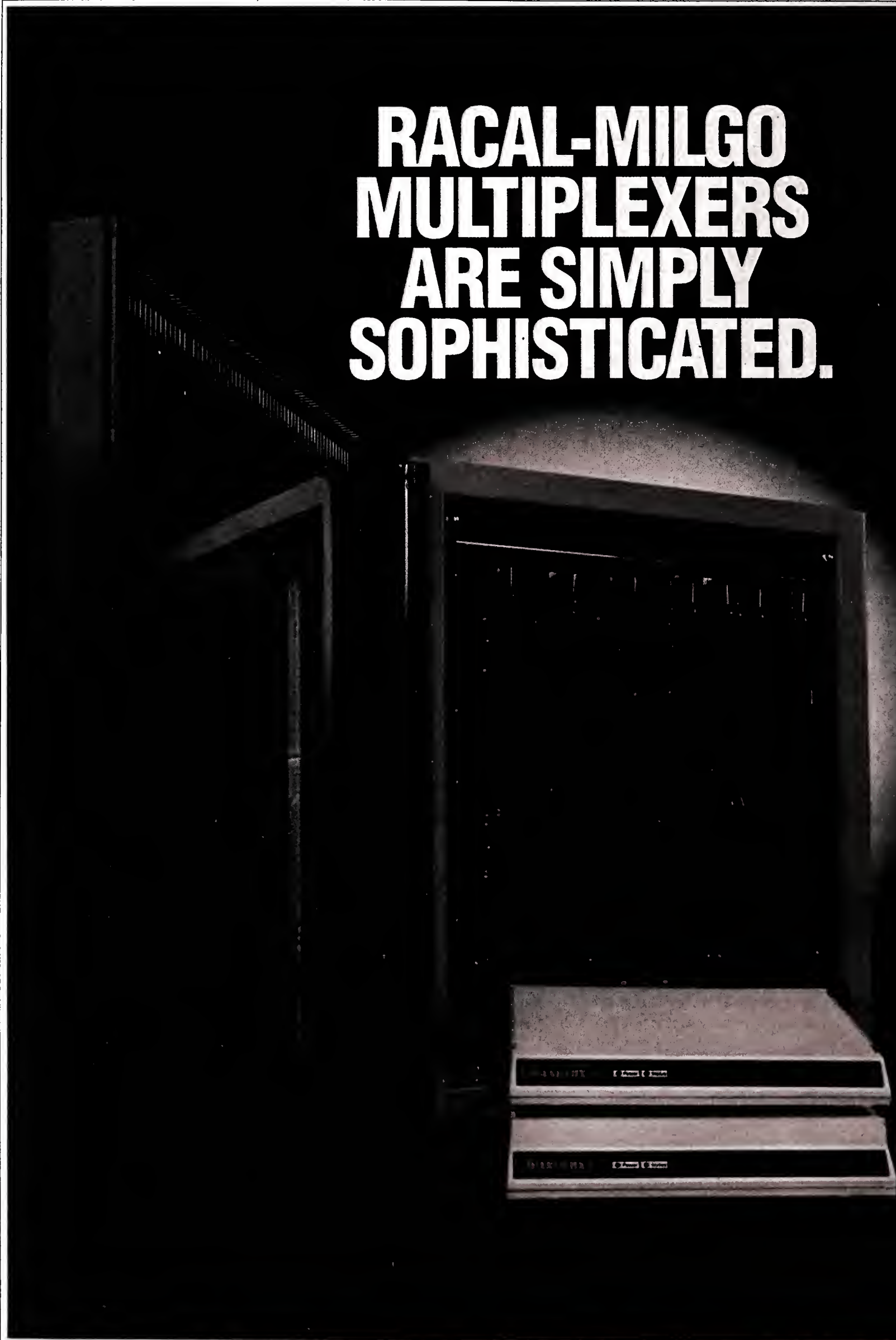
ADR, Route 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

■ **Computron Technologies Corp.** has introduced a utility that allows users to upload and download data in a Wang Laboratories, Inc. VS environment to a microcomputer.

According to the vendor, VS-Link can transmit raw data, formula expressions and calculated data to a microcomputer spreadsheet, graphics data base or modeling program.

VS-Link uses standard file formats and uses an asyn-

RACAL-MILGO MULTIPLEXERS ARE SIMPLY SOPHISTICATED.



SOFTWARE & SERVICES

chronous line to transfer information, a company representative said.

VS-Link costs \$2,000.

Computron Technologies, 150 Meadowland Pkwy., Secaucus, N.J. 07094.

■ **Formatted print, compare and data base edit facilities have been added to Consumer Systems Corp.'s Databasic/OS utility for testing data base environments in IBM's OS and DOS**

operating systems.

According to a company spokesman, Databasic/OS allows the user to create miniature IBM DL/1 data bases, produce data base comparison reports, interface with host languages for data base restructuring and create new data bases from existing files. In addition, Databasic/OS allows the user to correct data base content errors, report invalid numeric fields and manipulate data bases and master data base prob-

lems using DL/1.

A field initialization option automatically moves spaces or zeros to a specified field location, allowing users to initialize fields without writing special programs, a spokesman for the company said.

A permanent license for Databasic/OS is \$28,000. The DOS version is priced at \$17,500.

Consumer Systems, 1100 31st St., Downers Grove, Ill. 60515.

■ **Mips Software Development, Inc. has introduced Version 3.0 of Dyalog APL, its second-generation APL programming language interpreter for AT&T Unix operating systems.**

The enhanced version of Dyalog APL reportedly includes nested arrays, a full screen editor, a full screen data management facility, event trapping, a component file system and auxiliary processors that allow users to share libraries compiled

from C language, Fortran and other source code.

The product reportedly includes a standardized file system, virtual work space capabilities and an optional graphics package integrated into the APL interpreter.

Prices for Version 3.0 of Dyalog APL range from \$1,500 to \$9,000.

Mips Software Development, Suite 104, 31555 W. 14 Mile Road, Farmington Hills, Mich. 48018.

■ **Dylakor has announced enhancements to its data management/file management system. Version 8.5 of DYL-260 runs on IBM mainframes under IBM's OS and DOS operating systems.**

According to a spokesman, the capacity of the compiler in DYL-260, Version 8.5, has been increased to handle an unlimited number of DYL-260 statements. The enhanced version supports IBM 3375 and 3380 disk drives at the logical I/O control system level. Also, the product's record-found indicator will now be set to E when a sequential file reaches its end, and the sequential disk I/O routines are now compatible with third-party software.

Version 8.5 costs \$11,000.

Dylakor, 17418 Chatsworth St., Granada Hills, Calif. 91344.

■ **Advanced Systems Concepts, Inc. has announced Vaxshadow for the Digital Equipment Corp. family of VAX processors under VMS Version 3.0 or later, including Version 4.0.**

Vaxshadow is said to mirror DEC's Unibus, Massbus and Digital Storage Architecture-type disks. A primary disk is associated with one or two disk volumes to form a shadow set. All write operations are performed on all devices in the shadow set. Read operations are load-balanced for optimum performance.

If a hardware error occurs on any device within the shadow set, operations con-

Continued on page 70

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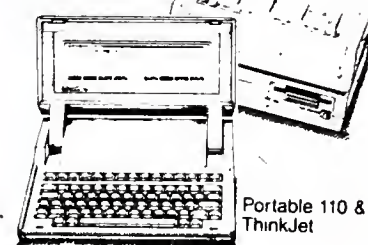
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SOFTWARE & SERVICES

Continued from page 69

tinue on the remaining volumes with no loss of service, the company said.

When the device is put back on-line, data is restored to ensure redundancy. Vaxshadow operations are transparent to applications programs.

Vaxshadow is composed of a device drive, DEC's Digital Command Language user interface program and a Vaxshadow server.

The price for Vaxshadow

is \$3,500 per CPU for all VAX-11 models, the vendor said.

Advanced Systems Concepts, 22 Hudson Place, Hoboken, N.J. 07030.

■ **Micro Focus Ltd. has announced what the company called Enhanced Technology (ET) versions of its High-Performance Level II Cobol compiler with native code generator, its Animator interactive source-level**

program analysis and maintenance tool and its Forms-2 screen painter. The products run under more than 50 AT&T Unix environments.

The Forms-2/ET screen painter is said to generate automatically Cobol source code for interactive displays. High-Performance Level II Cobol/ET is said to offer a capacity for code and data beyond the hardware limits of the host. The compiler is said to handle programs with a data division of up to 256M

bytes and a procedure division of up to 800M bytes.

Features of Level II Cobol/ET include shared text capability, said to allow an application program to be stored in memory for multiple users to share; mini compatibility with any Ansi Cobol program; and a preprocessor that converts nonstandard minicomputer Cobol source code to Level II Cobol.

Prices are as follows: \$2,500 for High-Performance Level II Cobol/ET, \$1,500 for

Animator/ET and \$375 for Forms-2/ET, the vendor said.

Micro Focus, 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

■ **Aim Technology has announced enhancements to its Aim Benchmark software for measuring user throughput and multiuser performance of programs developed under the AT&T Unix operating system.**

Among the reported enhancements of Aim Benchmark Release 1.6 are the inclusion of test results of the IBM Personal Computer AT, running under either Microsoft Corp.'s Xenix or IBM's PC/IX. Also included are test results of the Digital Equipment Corp. VAX-11/750 and VAX-11/780 minicomputers running under DEC's Ultrix.

Other enhancements are said to be improved benchmark portability between different Unix versions and different processors. Aim Benchmark reportedly uses nine tests of performance.

Aim Benchmark is priced at \$2,400 for a single-copy, single-site license.

Aim Technology, Suite 390, 4655 Old Ironsides Drive, Santa Clara, Calif. 95050.

■ **Concentric Associates, Inc. has announced Shell Accelerator (Shacc), a C compiler for the Bourne shell, the standard shell associated with AT&T's Unix.**

Shacc produces C code and invokes the C compiler to produce an executable file. The generated C code is structured, readable and accessible to the user. Shacc reportedly allows programmers to write production code in the Bourne shell, thus increasing productivity.

Pricing for Shacc ranges from \$1,000 to \$20,000, depending on the size of the system.

Concentric Associates, One Harmon Plaza, Secaucus, N.J. 07094.

■ **Ivan Software, Inc. has announced the Ivan-Virtex interface, designed to provide users of the Virtex on-line communications driver from Bonnetcase, McLeroy and Harrison, Inc. with full screen text editing and source program librarian functions.**

The Ivan interface is said to give users access to Ivan-Lib/Ivan-Edit, the company said. Ivan-Lib is a menu-driven source program librarian that keeps production and test libraries separate and provides security for production and development work. File access, program modifications and deletions may be controlled through Ivan-Lib and the system administrator.

Continued on page 74

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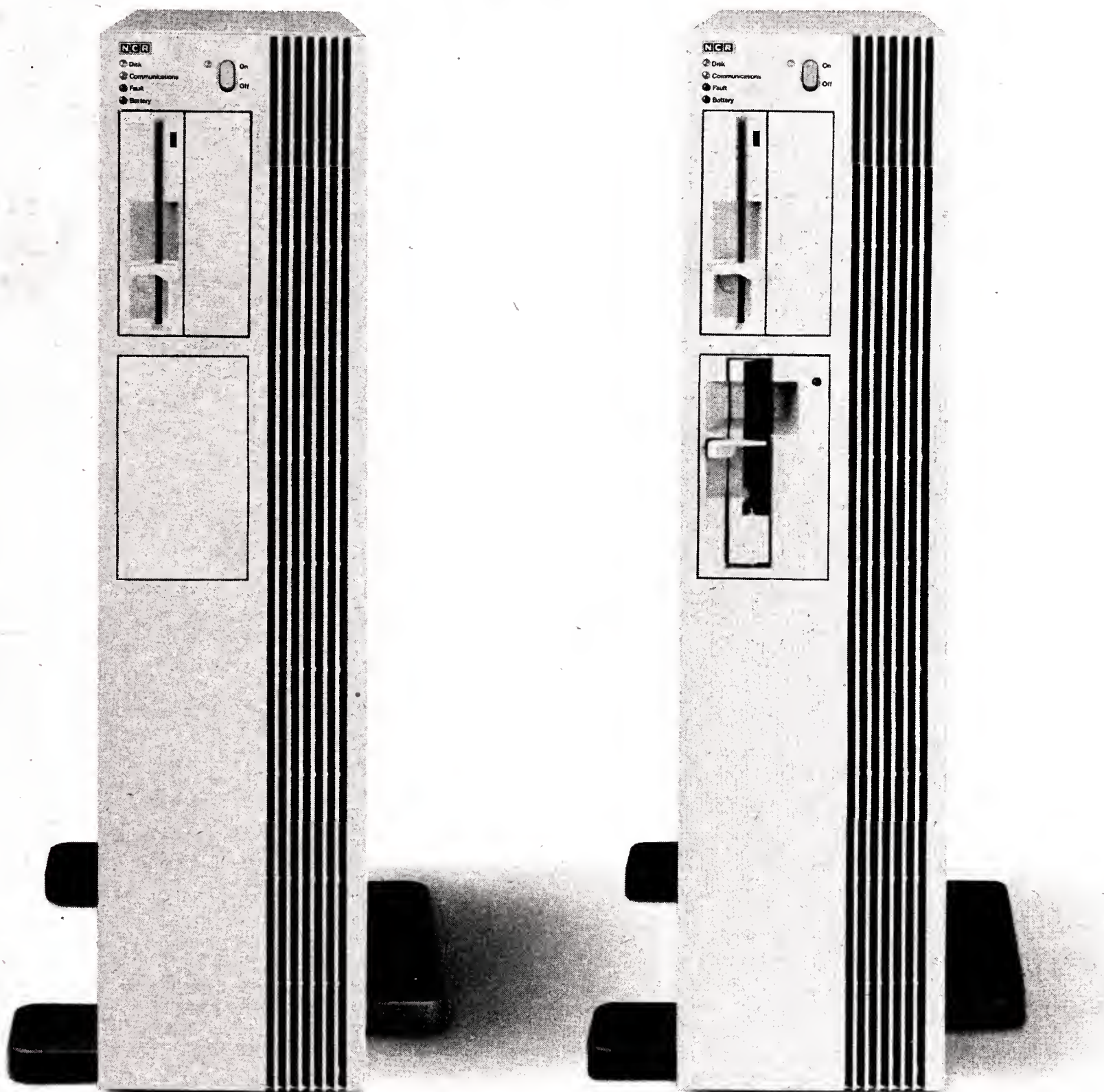
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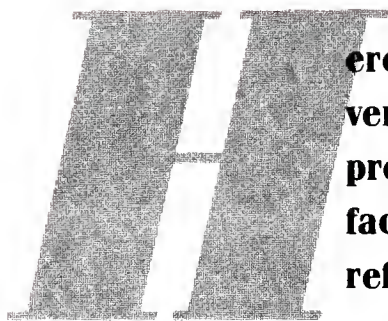
The new Tower XP on the right, on the other hand, can cure even bigger headaches. Because it's an even more potent computer.

It can handle up to sixteen users simultaneously. It is powered by blindingly fast Motorola 68010 microprocessors. It offers up to eight megabytes of memory. Up to 260 megabytes of disk storage. It has the same operating system as the regular Tower: UNIX

SYSTEM V*. And, like the regular Tower, it can stand alone or as part of a large DDP network via SNA, X.25 and other industry standard protocols.

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Continued from page 70

Ivan-Edit is an interactive, full screen text editor intended to increase program development efficiency by page-mode cursor control, on-line Help commands, a menu-driven administrator function, a mail file facility and a Scan command. The Ivan-Virtex interface costs \$1,500.

Ivan Software, 120 N. Keowee St., Dayton, Ohio 45402.

APPLICATION PACKAGES

■ **Hogan Systems, Inc.** has announced a financial management system called Preferred Client Services (PCS) for IBM mainframes that focuses on providing information and managing financial activity for bank customers.

A Hogan spokesman said customer information is provided via integrated reports including net worth analysis, income analysis and Demand Deposit Accounting transactions. Financial activity is managed by English-language plans, designed to customer specifications within bank tolerances. Funds movement can be between any account within bank systems tied to PCS.

License fees for PCS start at \$200,000.

Hogan Systems, 5080 Spectrum Drive, Dallas, Texas 75248.

■ **Chicago-Soft, Ltd.** has announced Release 3.0 of its Dynaplan spread-

sheet for IBM MVS/TSO and VM/CMS environments.

A company spokesman said the enhanced version features windowing capabilities similar to those found in Apple Computer, Inc.'s Macintosh microcomputer. Reportedly, Dynaplan can split screens horizontally and vertically and can overlay multiple windows. The windows can be moved around the screen, adjusted in size and stacked on top of one another. Smaller windows can also be zoomed to full screen size and back again.

Help windows appear on the screen when needed to aid the user in entering commands, and up to 255 worksheet planes can be viewed through multiple windows. A formula can refer to any cell or named range in any spreadsheet plane, allowing for consolidation of multiple spreadsheets with differing formats.

Dynaplan applications include nonprocedural decision support, three-dimensional modeling, applications development and report generation. Upload and download of Lotus Development Corp.'s 1-2-3 and Software Arts, Inc.'s Visicalc worksheets are also provided.

Version 3.0 of Dynaplan is priced between \$10,500 and \$13,500 depending on the host operating system; the lease price ranges from \$400 to \$700 per month.

Chicago-Soft, Suite 2, 738 N. LaSalle St., Chicago, Ill. 60610.

■ **The Mega Group, Inc.** has introduced software that adds statistical modeling, analysis and forecast-

ing capabilities to Megacalc, its IBM mainframe spreadsheet package.

Megastat reportedly allows users of on-line microcomputers or remote display terminals to enter data into the mainframe in spreadsheet format and construct models, forecasts and graphs with keyboard commands. The product includes on-line Help for statistical results and prompting for all commands.

According to a company spokesman, Megastat includes capabilities for regression analysis and model-building techniques for business and scientific applications. Megacalc, which can be used to generate and consolidate reports or prepare sales projections, is priced at \$5,000.

The Mega Group, 17701 Mitchell Ave. N., Irvine, Calif. 92714.

■ **Data Processing Services, Inc.** has introduced a purchasing module for its Distribution Processing System.

DPS/38, written in RPG-III for the IBM System/38 minicomputer, includes order processing/invoicing, accounts receivable, inventory control and sales analysis modules.

According to a company representative, the purchasing module generates purchase orders and can handle inquiries and tracking of open purchase orders. Purchase orders can be entered and used to update inventory balances and receipt histories. Transaction lists can be printed to indicate differences in received quantities or unit costs against the original pur-

chase order. DPS/38, including the purchasing module and source code, costs \$47,500.

Data Processing Services, 8604 Allisonville Road, Indianapolis, Ind. 46250.

■ **Para Research, Inc.** has announced Easy Report for IBM System/34 and System/36 minicomputers. The product is said to respond to English commands to produce listings and reports from any accounting data file without the aid of a programmer.

Easy Report comes with 28 Para Research accounting files, including general ledger, billing, inventory, payroll, fixed assets, accounts payable and accounts receivable. Easy Report runs under IBM's RPG-II, the company said.

Easy Report is priced at \$750.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

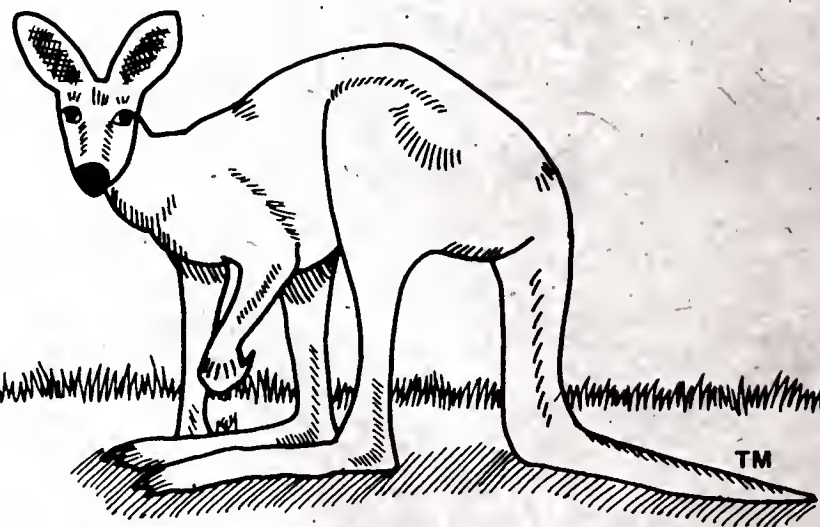
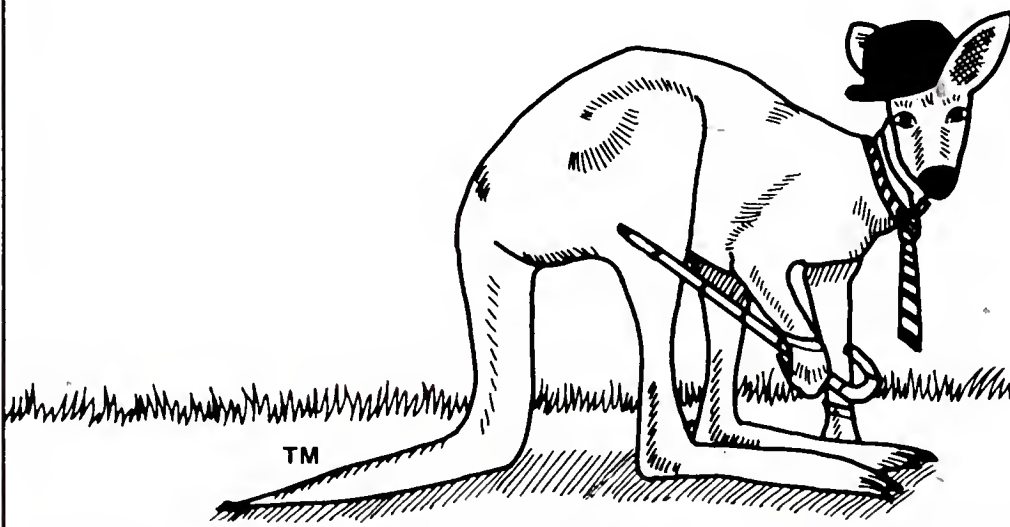
■ **Vanguard Software and Systems, Inc.** has introduced an integrated accounting and financial package designed to operate on Honeywell, Inc.'s DPS 6 computer under Honeywell's Gcos operating system and on IBM Personal Computers running under Microsoft Corp.'s MS-DOS operating system.

The Vanguard Software package includes modules for general ledger, accounts payable, accounts receivable, payroll, job costing, purchasing, estimating and tool control.

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SOFTWARE & SERVICES

ranges from \$8,000 to \$35,000, depending on equipment. Modules can also be purchased separately and are priced between \$2,500 and \$5,000.

Vanguard Software and Systems, Suite 500, 12121 Wickchester Lane, Houston, Texas 77079.

■ **Michaels, Ross & Cole Ltd.** has announced Release 6.0 of its MRC-Reporter report writing package for the IBM System/38.

The package is designed to allow nontechnical end users to create reports.

According to the vendor, Version 6.0 includes shared access path logic and features calculation improvements including the ability to define total level calculated fields, which may be entered free format.

Version 6.0 of the MRC-Reporter is priced at \$1,140 per module per CPU.

Michaels, Ross & Cole, P.O. Box 4533, Oak Brook, Ill. 60521.

■ **Syntactics Corp.** has announced that its Crystalwriter word processing program now supports AT&T's Information Systems' 3B family of computers.

According to a spokesman, Crystalwriter is an AT&T Unix-based program that was designed for multiuser environments. It features a library of predefined document types, a screen display and English-like commands.

The product is said to be compatible with AT&T's 3B2 supermicrocomputer and the 3B5 and 3B20 superminicomputers. Crystalwriter is priced at \$995.

Syntactics, Suite 145, 3333 Bowers Ave., Santa Clara, Calif. 95051.

■ **Koch Systems Corp.** has added the Financial Futures and Hedging System to its Thesis securities trading, accounting and portfolio management package for IBM mainframes under VM.

The Financial Futures and Hedging System reportedly provides accounting and record-keeping support to portfolio managers using financial futures for investment and risk management. It is said to support long- and short-term investment positions, level yield amortization of gains or losses, financial futures contracts and tracking of hedged investments.

The system uses Oracle Corp.'s Oracle relational data base management system. It includes standard reports, including daily transactions, open positions, closed positions, margin variations, initial margins, historical summaries and a general ledger interface.

The system's base price is \$50,000.

Koch Systems, P. O. Box 2510, San Francisco, Calif., 94126.

■ **Harris Data Service, Inc.** has introduced a human resource information package for the IBM System/34 and 36 minicomputers.

The Harris Personnel Manager is said to provide a personnel department with real-time information retrieval capabilities that include full security and editing, salary administration, organizational planning, skills inventory, applicant tracking, attendance management and facilities for federal Equal Employment Opportunity and Occupational Safety and Health Administration reporting.

The Harris Personnel Manager, in-

cluding IBM RPG-II source code and documentation, costs \$8,000.

Harris Data Service, 11629 W. Dearbourn Ave., Milwaukee, Wis. 53226.

■ **MCBA, Inc.** has announced that Release 7 of its Dibol accounting and distribution system is available for Digital Equipment Corp.'s VAX-11 computers.

Dibol is said to feature nine packages, including accounts payable and receivable, bill of materials processing, customer order processing, fixed assets and depreciation, general ledger, inventory management, payroll and purchase order and receiving.

Price of the source code licenses for Dibol range from \$750 to \$6,000.

MCBA, 2441 Honolulu Ave., Monrovia, Calif., 91020.

■ **Motorola/Four-Phase Systems, Inc.** has announced that Access Technology, Inc.'s Supercomp-Twenty Spreadsheet Modeling package is now available for Four-Phase's AT&T Unix-based Series 2000 and Series 6000 families of office information systems.

The package features a portable modeling environment in which users can share work on a variety of systems, including microcomputers, minicomputers and mainframes, the vendor said.

Features include matrices as large as 1,000 by 1,000, with cells that may contain descriptive labels, numbers or formulas; goal-seeking capabilities; multiple consolidation; command files; and the ability to read data from a variety of data bases and other application packages.

Supercomp-Twenty costs \$500 for

both Series 2000 and 6000 systems.

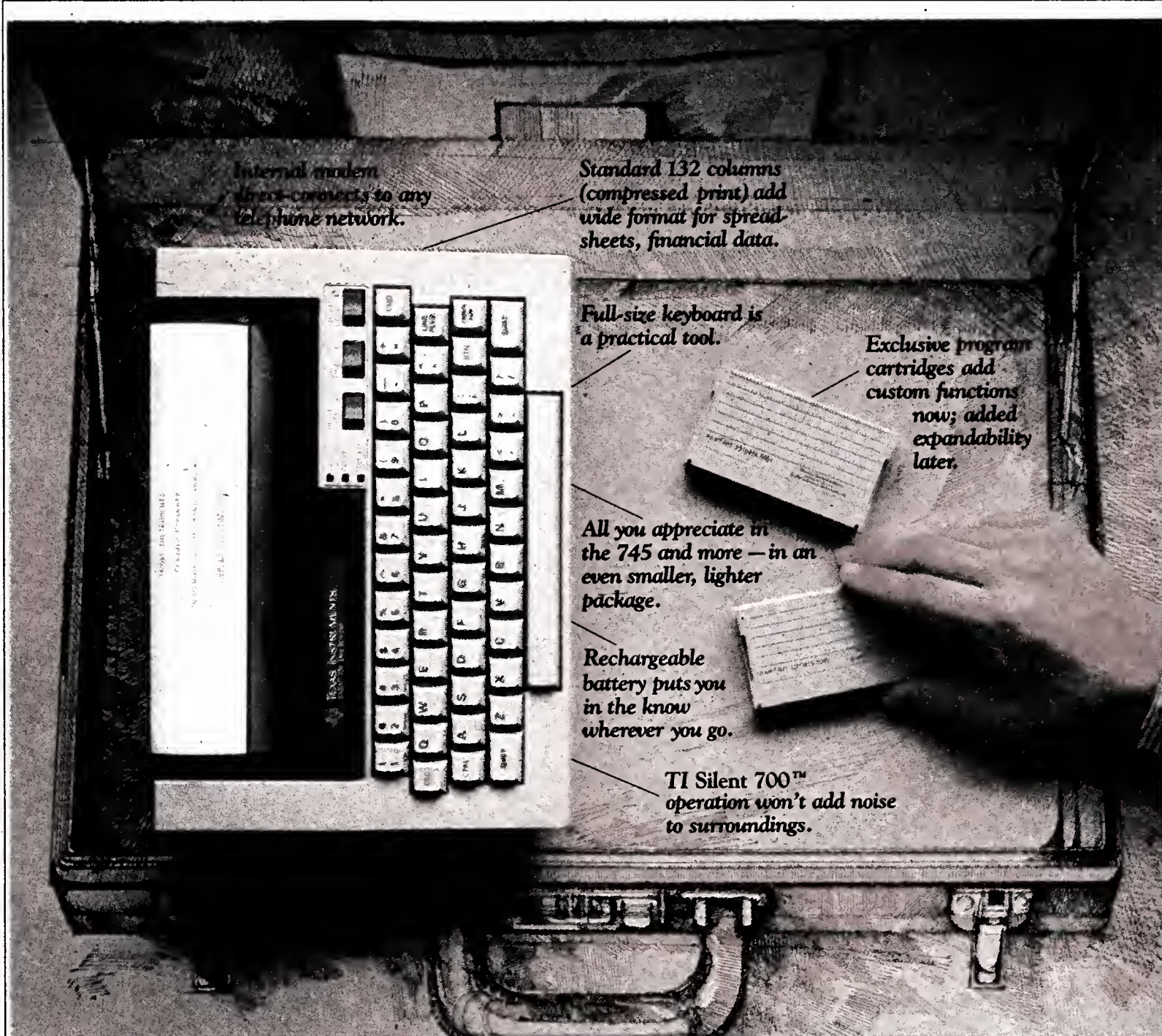
Motorola/Four-Phase Systems, 10700 N. DeAnza Blvd., Cupertino, Calif. 95014.

■ **Cericor, Inc.** has introduced its CDA 5000 design automation system that runs on a variety of mini-computers.

The CDA 5000 system reportedly uses a portable language and complexity management techniques. It is said to allow integration of all design functions with a data base, with no need for compilation or linkage steps.

The CDA 5000 runs on the Ridge Computers 32C and 32S and all machines from Apollo Computer, Inc., Masscomp, Sun Microsystems, Inc. and Cadmus Computer Corp. Its integrated data base is said to permit rule

Continued on page 78



Only Texas Instruments packs more portable terminal into less space.

Here's a brief case for the Texas Instruments Silent 700™ Model 707 Portable Data Terminal. It's the latest and lightest in a long line of standard-setting Silent 700™ terminals. And it's the most versatile full-function portable anyone can pack into a briefcase.

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modem connects to any telephone network while the optional acoustic coupler and battery pack make it fully portable. The spreadsheet size 132-column printer is now standard. And TI's solid state plug-in cartridges can add functions for your current use and later expansion.

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GTE Telenet

SOFTWARE & SERVICES

Continued from page 75

checking as the design is created and to make the simulator and component creator available within seconds.

CDA 5000 is priced at \$19,900.

Cericor, 716 E. 4500 South, Salt Lake City, Utah 84107.

■ Precision Visuals, Inc. introduced a device driver said to allow users of IBM's 3270 PC/G and PC/GX graphics workstations to access Precision Visual's DI-3000 and GK-2000 graphics software packages on IBM mainframes running MVS/TSO and MVS/CMS.

According to the company, the PC/G and PC/GX driver supports IBM graphics input devices, including the IBM 5277 mouse and the IBM 5083 Model 2 tablet. Applications are said to retrieve cursor positioning data

using standard DI-3000 and GK-2000 calls. The product is priced at \$1,000.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

DATA BASE MANAGEMENT SYSTEMS

■ Relational Technology, Inc. (RTI) has announced that Version 2.1 of its Ingres relational data base management system (DBMS) now supports most versions of AT&T's Unix for Digital Equipment Corp.'s VAX processors. Ingres can run under AT&T's System V, the University of California at Berkeley 4.2 Unix and DEC's Ultrix version of Unix.

RTI also announced a marketing

agreement to offer Ingres on Computer Consoles, Inc.'s (CCI) Power 6/32 superminicomputer. RTI will sell Ingres directly for the Power 6/32 operating system, a version of Unix for CCI's supermini. The first binary license fee for VAX/Unix Ingres costs between \$22,500 and \$60,000 depending on the host machine.

RTI, 2674 N. First St., San Jose, Calif. 95134.

■ Cincom Systems, Inc. has announced Release 1.6 of its TIS integrated relational data base management and applications support systems for IBM's 3080 and 4300 series and compatible mainframes under IBM's MVS and OS/VS1 operating systems.

According to a representative, added features in Release 1.6 of TIS

include decision support system enhancements, a query copy utility, logical user view (LUV) support for IBM Vsam files, functional improvements to LUV and functional improvements to Dbaid, the system's logical view testing and debugging aid. Release 1.6 of TIS is a maintenance release and is available at no extra charge. The price of the complete TIS system begins at \$193,000.

Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

■ Micro Data Base Systems, Inc. has introduced a version of its MDBS III relational data base management system (DBMS) for Digital Equipment Corp.'s VAX-11/780 minicomputer.

MDBS III runs under DEC's Ultrix operating system and reportedly allows users to define data base structures without redundancy and permits direct representation of many-to-many and recursive relationships.

The software is also said to offer security facilities, integrity checking and automatic crash recovery facilities. It is priced at between \$8,000 and \$30,000, depending on options and users.

Micro Data Base Systems, P.O. Box 248, Lafayette, Ind. 47902.

■ Software House has announced Version 116B of its System 1022 data base management system (DBMS) for Digital Equipment Corp. Decsystem-10 and Decsystem-20 mainframes.

According to a spokesman, the upgraded product features compiled procedures that allow users to compile any System 1022 program and save the intermediate code in disk files for future use. An added Help facility provides messages that explain a system command, display appropriate syntax, present examples and refer the user to related topics and subtopics.

A System 1022 license costs \$32,500 for the Decsystem-20.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

LANGUAGES

■ Expert Systems International has announced a version of Prolog-1 for Digital Equipment Corp.'s VAX series processors running under DEC's VMS operating system.

The VMS version of Prolog-1 uses the standard Edinburgh syntax of the Prolog language and is compatible with Digital Research, Inc.'s CP/M 80 and CP/M 86, Microsoft Corp.'s MS-DOS and DEC's RSX-11M+ and RT-11 Prolog-1 implementations.

Reportedly, interprocess communication is provided through the VAX/VMS mailbox facility, allowing Prolog-1 to call or be called by any VAX/VMS language, including Ada. The product's interpreter features an execution time of 1,000 logical inferences per second, floating-point arithmetical capabilities, a trace facility and a backtrace predicate useful in error correction. Predicates may have up to 127 arguments and an equal number of components. The price of Prolog-1 for VMS is \$3,275.

Expert Systems International, 1150 First Ave., King of Prussia, Pa. 19406.

INDAS

The intelligent solution for an Integrated Data Analysis System

The Most Complete.

We believe INDAS is the most complete data analysis system currently available for VAX computer systems. In addition to providing a 4th generation programming language that integrates data base management with an excellent complement of procedures for statistical analysis, INDAS offers both presentation quality graphics (INDAS-GRAPHICS) and screen oriented data entry and editing (INDAS-SCREEN) as low cost options.

INDAS statistical procedures include: ■ General linear model (regression, ANOVA, MANOVA, and COANOVA) ■ Cox's regression ■ life tables ■ non-linear regression ■ and all other possible regressions ■ cluster analysis ■ correlation (Pearson, Spearman, and Kendall) ■ canonical correlation ■ discriminant analysis ■ Duncan's analysis ■ factor analysis (including maximum likelihood) ■ frequency tables ■ Guttman scale analysis ■ non-parametric ANOVA (one way) ■ randomized experiment design ■ probit analysis ■ spectral analysis ■ stepwise regression ■ t-test ■ and summary statistics.

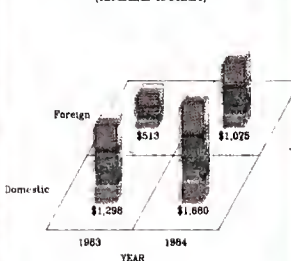
The INDAS structured programming language includes subprograms, macros, numeric and character data types, as well as dynamic matrix variables and a large selection of matrix operators and functions.

The integrated data base facility allows data records to be selected, sorted, merged, joined, and updated.

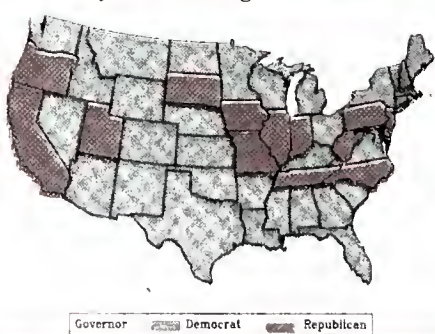
INDAS-GRAPHICS generates full color, presentation quality charts, graphs and choropleth maps. Bar, pie, star, and block charts are provided. X-Y line plots may include spline fitting and filling between curves.

INDAS-SCREEN allows non-programmers to design multi-screen forms for data entry and file maintenance.

Foreign and Domestic Sales
(Thousands of Dollars)



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SAS is a trademark of the SAS Institute, Inc. SPSS is a trademark of SPSS, Inc. BMDP is a trademark of BMDP Computer Software.

VAX, VMS and DEC System-2060 are trademarks of Digital Equipment Corporation.

*Comparisons are based on product descriptions published by the manufacturers as of September, 1984 and are provided for illustrative purposes only.

The following table illustrates INDAS's capabilities in some critical functional areas.

Data Analysis Systems for VAX/VMS*				
Feature	INDAS	SPSS	SAS	BMDP
Structured programming language	✓	✓	✓	
Matrix language	✓	✓	✓	
Integrated database	✓	✓	✓	
Integrated graphics	✓	✓	✓	
Screen oriented data entry and edit facility	✓		✓	
Unrestricted problem size	✓		✓	
Cox's Regression	✓			✓
Life tables	✓	✓		✓
Spectral analysis	✓		✓	✓

The Most Advanced.

INDAS's statistical procedures are based on the latest, most advanced algorithms. Because memory allocation is automatic and dynamic, problem size is limited only by overall hardware capacity.

The Most Cost Effective.

We believe INDAS is the most cost effective data analysis system available.

A major university has benchmarked INDAS against SAS, both executing on a VAX 11/750, and against SPSS and BMDP executing on the much more powerful and expensive DEC System-2060. For all statistical procedures measured by the Longley data set, INDAS executed up to 3 times faster than SAS. As measured by the Shain data set, INDAS performed data base operations up to 6 times faster than SAS. Many user-written programs can be executed by both INDAS and SAS without change.

INDAS's execution speeds of the Longley data set on the VAX 11/750 were equivalent to or faster than either SPSS or BMDP executing on the DEC System-2060.

But INDAS offers more than speed and compatibility. INDAS annual license fees range from \$2000 to \$6000, depending on the VAX cpu model licensed.

We Invite Comparison.

A ninety (90) day demonstration of the complete INDAS system is available for \$150 to customers resident in the USA, slightly more in other countries.

s&h computer systems, inc.

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SOFTWARE & SERVICES

■ **Digital Information Systems Corp.** has introduced a portable version of Digital Equipment Corp.'s Dibol programming language to run under AT&T Unix Systems III and V, Version 7, University of California at Berkeley Versions 4.1 and 4.2 and Unisoft System Corp.'s Uniplus operating systems.

The enhanced version of Data Business Language (DBL) offers the ability to link with non-DBL programs and to interface with subroutines written in other languages, the vendor said.

A software virtual-memory environment reportedly allows the creation of programs of any size without overlaying. Other features are said to include multikey IBM Isam files, full screen programming functions, and a symbolic debugger.

In addition, programs written in DBL can be transported between hardware systems under Microsoft Corp.'s MS-DOS, S&H Computer Systems, Inc.'s TSX and TSX-Plus and DEC's VMS, RSX, RT-11 and RSTS/E, the vendor said.

Prices begin at \$449 for micro versions of DBL Version 4 and range up to \$3,549 for supermini versions.

Digital Information Systems, Suite 340, 3336 Bradshaw Road, Sacramento, Calif. 95827.

■ **Franz, Inc.** has announced that its Franz Lisp language product is now available to users of Digital Equipment Corp. VAX series processors under VMS. The company also announced an agreement with Tektronix, Inc. to supply Franz Lisp on Tektronix's 4404 Artificial Intelligence workstation.

According to a spokesman, Franz Lisp includes the Franz Lisp Interpreter, a compiler, a complete Lisp runtime library, Fortran and C runtime Lisp interfaces that allow Fortran or C routines to be executed from Lisp programs and graphics support on processors with graphics capabilities.

For the VAX-11/780, Franz Lisp is priced at \$7,000 for the first copy and \$1,400 for each subsequent copy. Franz Lisp is priced at \$5,000 for the first copy and \$1,000 for each subsequent copy for the VAX-11/750 and VAX-11/730 and the Tektronix 4404.

Franz, Suite 203, 2920 Domingo Ave., Berkeley, Calif. 94705.

REMOTE COMPUTING SERVICES

■ **National Information Systems, Inc.** has announced the availability of BBN Software Products Corp.'s RS/1 research system software on its time-sharing service.

According to a spokesman, RS/1 is a computerized notebook used by engineers and scientists to gather and analyze data. It permits direct entry of data and stores information in two-dimensional tables. An interactive dialogue permits the user to develop scatter plots, line graphs, histograms, bar graphs and pie charts.

The RS/1 system is available for the standard time-sharing fee of \$12/hour during peak hours — Monday through Friday between 7 a.m. and 6 p.m. Pacific Standard Time — and \$8 per hour during off-peak hours. Users are also charged 37 cents per CPU second during prime time and 31 cents per CPU second during off-

peak hours, the vendor said.

National Information Systems, Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

■ **Telebase Systems, Inc.** has introduced the Easynet retrieval service, which allows microcomputer users to access remote data bases by telephone.

According to the vendor, users can access Easynet by connecting their terminals via a modem to the telephone and dialing the Easynet access number. A series of menu screens reportedly helps the user determine the topic of interest. When the user keys in the desired data base, the network dials out to the data base, logs on, searches, logs off and returns the results, the vendor said.

An Easynet search, which takes

about 10 minutes, costs \$12.

Telebase Systems, 134 N. Narberth Ave., Narberth, Pa. 19072.

■ **Neshaminy Valley Information Processing, Inc. (NVIP)** has introduced Resource Management Service (RMS), a remote data service for IBM mainframe users.

According to the company, RMS provides clients with a dedicated large-scale CPU housed at NVIP's corporate data center, an international network and telecommunications facility, systems and applications software, backup and recovery systems, operations and maintenance support and quality control.

The base price of the system is \$70,000, but prices vary depending on CPU size, peripherals, software and telecommunications equipment.

Neshaminy Valley Information Processing, 4850 Street Road, Trevoise, Pa. 19049.

■ **Control Data Business Centers, Inc. (CDBC)** and Information Science, Inc. (Insci) have jointly announced a payroll and personnel service for users of IBM Personal Computers or compatible microcomputers under Microsoft Corp.'s MS-DOS operating system, with a disk drive. The Incontrol service links the Insci 90 Personnel product and CDBC's Payroll 4 product for companies of 200 or more employees.

The payroll service from CDBC includes one-day turnaround with local service, deductions for cafeteria benefits plans, deferred compensation calculations, automatic tax fil-

Continued on page 80

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For more information about these three new sizes of database software, call toll free: (800) 833-4707; In New York State (800) 553-5566. Or write BRS Software Sales Support, 1200 Rte. 7, Latham, N.Y. 12110. Dealer and OEM inquiries invited.



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SOFTWARE & SERVICES

Continued from page 79

ing, direct deposit, data base analysis and financial reporting.

The human resources service from Insci offers capture of 400 information elements per employee, storage of historical information, applicant and recruitment tracking, career development and internal promotion records, government compliance reports, benefit and insurance reporting and salary planning.

According to the vendor, the price of the service varies according to the customer's size and needs. For a company of 500 employees doing payroll twice a month, the cost is less than \$4 per employee per month, with an installation charge of about \$4,000.

Control Data Business Centers, P.O. Box 7100, 500 W. Putnam Ave., Greenwich, Conn. 06836.

ON-LINE DATA BASES

■ Computer Consoles, Inc. (CCI) has announced the BRS Search text retrieval software for its Officepower office automation system running on the CCI Power 6 superminicomputer.

BRS Search is said to enable Officepower users to retrieve information from a range of private and public document data bases. Officepower reportedly incorporates word and data processing, file management, electronic mail and decision support functions.

Users can keypunch documents produced on the system or from outside sources. Captured text can be displayed, edited, filed, printed or mailed, CCI said. BRS Search reportedly indexes every word in a document, allowing the user to retrieve using key words only.

BRS Search costs \$45,000.

CCI, 97 Humboldt St., Rochester, N.Y. 14609.

■ Compuserve, Inc. has added a data base with information on com-

modities futures contracts to its Consumer and Executive Information Services.

Through the data base, users can retrieve information on the open, high, low and settlement prices as well as the volume and open interest on 58 commodities traded in the U.S. and Canada, the vendor said.

Compuserve charges \$12.50/hr for on-line access between 8 a.m. and 6 p.m. and \$6/hr for access during off-peak hours, with an 8-cent surcharge for each contract accessed.

Compuserve, 5000 Arlington Centre Blvd., Columbus, Ohio 43220.

METHODOLOGIES

■ Management and Computer Services, Inc. (Macs) has introduced an expanded portfolio of test plan standards that incorporate a series of suggestions for testing on-line systems such as IBM's CICS and IMS/DC and Cullinet Software, Inc.'s IDMS/DC.

The portfolio reportedly includes a 10-step action plan outlining how to build standards tailored to a range of development environments.

According to a vendor spokesman, the standards reflect a range of operating environments and are designed to address the structuring of a test environment and development of procedures to control the portion of the programming life-cycle effort devoted to testing.

Use of the standards does not require Macs' software products to gain improvements, the spokesman said.

The expanded package of test standards reportedly may be obtained free of charge through a written request to Macs on letterhead stationery.

Macs, 74 Great Valley Corporate Center, Valley Forge, Pa. 19482.

■ Advanced Information Management has introduced an enhanced version of its Aim/Safe contingency planning methodology.

According to a company spokesman, Aim/Safe leads a company through development and management of a disaster recovery plan.

The product now includes a sample contingency plan in IBM Personal Computer-compatible diskettes, the spokesman said. New forms, flowcharts, organizational charts and matrices reportedly have been added.

Aim/Safe is priced at \$9,950.

Advanced Information Management has also added Aim/Plan, an electronically formatted plan consisting of Emergency Response, Failure Assessment and Control Center modules.

Aim/Plan is available for \$3,900.

Advanced Information Management, 1988 Opitz Blvd., Woodbridge, Va. 22191.

TRAINING

■ Deltak, Inc., has announced a set of training videotapes for Cullinet Software, Inc.'s IDMS/R data base management system and Version 10.0 of IDMS/R.

According to a spokesman, Software Updates is a four-course series of programs intended for experienced IDMS application programmers, data base administrators and systems programmers.

The courses may be taken individually and in any order.

According to Deltak, the courses cover improvements to IDMS/R, the product's Integrated Data Dictio-

nary, changes to IDMS/R telecommunications software, enhancements for compatibility with IBM's MVS/XA operating system and improvements to the system's Application Development System/Online and On-line Query features.

Course rentals range in price from \$50/mo to \$130/mo, depending on the volume of use. Each course can also be purchased for \$1,750.

Deltak, East-West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

■ DBMS, Inc. has announced an expanded curriculum of training courses for Cullinet Software, Inc.'s IDMS data base management system.

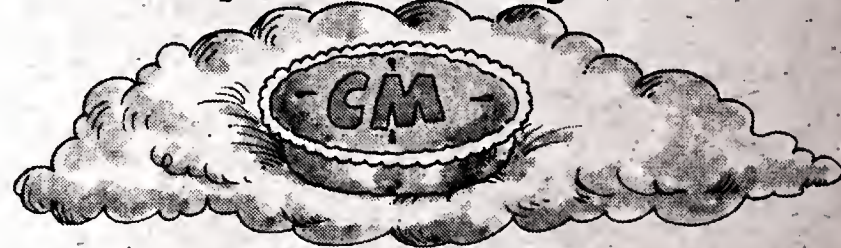
According to a spokesman, an on-line training system containing a sample data base can be installed at the customer site, or users can attend the training courses at the vendor's headquarters.

The expanded curriculum reportedly now includes courses on Cullinet's Application Development System/On-line (ADS/O) Application Generations, ADS/O Programming, Culprit Programming, IDMS-DB Programming, IDMS/DC Programming and fundamentals of the Integrated Data Dictionary.

Course costs range from \$300 to \$800 for one- to four-day courses held at the vendor's headquarters. Courses held at customer sites cost \$1,500 each.

DBMS, 1801 Mill St., Naperville, Ill. 60540.

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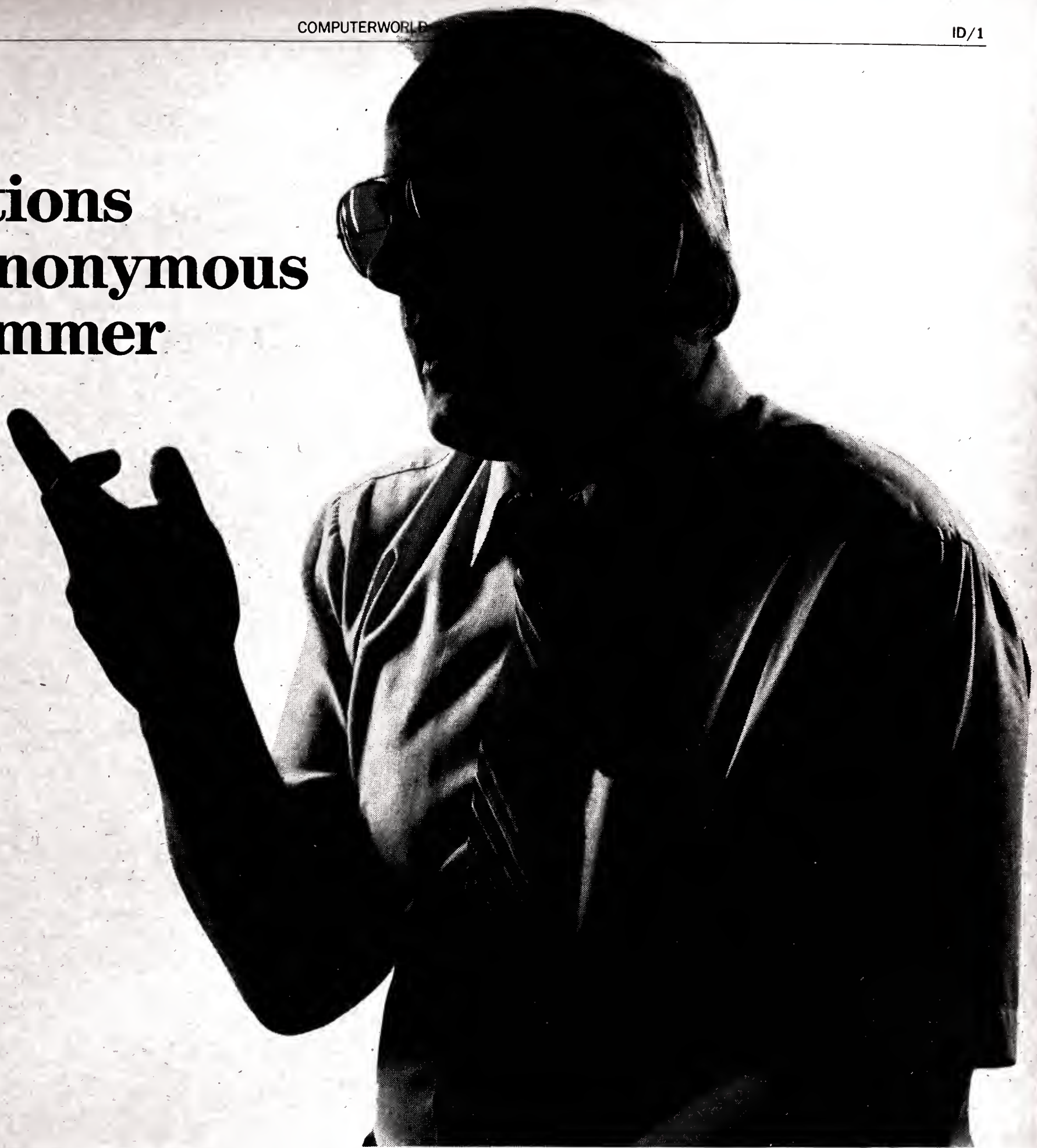
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IN DEPTH

Reflections of an anonymous programmer



"Everyone assumes it is not possible to hold DP to the standards of predictability and cost control that apply to everyone else."

"Groups take so long to use new manpower because they choose to and because wasting time and territory guarding have come to be their major functions."

"I wonder — Couldn't this work be done well?"

By Programmer X

Corporate officers in charge of real profit-making activities must be constantly puzzled by the slowness, expense and obtuseness of data processing departments. Once, walking down the hall behind a group of visiting dignitaries, I heard the guide say to the new president, motioning broadly to our area of work, "And here is all the gray matter." Programming groups are, to these interested outsiders, "gray matter" — impenetrable, delicate and mysteriously unpredictable.

The activity of a group of applications programmers writing code to accomplish a useful system has never been understood. We do not know how long this work should take, how well it should be done or how much it should cost an organization.

We know how much time has been consumed for the development of a system in our experience, but we have not analyzed that expenditure of time. We assume that systems will be written so badly that 50% to 80%

of the department's time is to be expended in their maintenance. We know what it costs to hire contractors to write a new job, but in hiring them, we write off the capacity of our own programming groups to bring in the same accomplishment.

From the point of view of the programmer, and I am one, programming groups show themselves to be insensitive to the main value of their calling, jealous and territorial in their internal relations, unwilling to confer authority, consistently demoralizing and awesomely wasteful of time and budget. Certain statistics repeatedly cited in professional studies seem to bear these opinions out.

Everyone agrees that programmers change jobs at a scandalous pace. An image of the ambitious expert comes to mind with these words. Yet consider the programmers you have met. These are not aggressive personalities making million-dollar demands; these are, well, programmers, pencil-and-paper types, without a Cross pen or the

IN DEPTH/ANONYMOUS PROGRAMMER

business ambition of your paperboy among them. These are, in the main, professional craftsmen, and when you see a programmer changing jobs, he is in all likelihood fleeing organizational circumstances that make the application of his craft more difficult than it should be.

We have all seen the very low figures surveyors report when they attempt to ascertain the average number of lines of debugged code a programmer produces a month — 30, 50, something of that magnitude. Yet the same surveys consistently show that some productive programmers produce 10 times the average. Here is industrywide evidence for something that working programmers can plainly see, that is, that a few elite people have claimed all the territory, resulting in an extensive waste of man-hours and much nervous finger-

ing of classified sections among the unchosen many.

Finally, studies of the break-in time for a new programmer indicate that it takes one to two years before he is of much practical use to an organization. To claim that anything like 300 eight-hour days are required to teach an already educated and professionally prepared individual enough to take responsibility in what is essentially a technical rather than judgmental role is the uttermost nonsense. Groups take this long to use new manpower because they choose to and because wasting time and territory-guarding have come to be their major organizational functions.

Again, the group activity of program writing to accomplish a useful system has never been understood. The fruit of our craft has restruc-

tured other departments, but the structure of our own departments has not generally been open to question.

We go on assumption as to the shape of our working groups. The inefficiency that is produced by our assumptions is subsidized by the vast efficiency of the processing machinery itself and protected by the entrenchment of our departments. If two junior members of a four-member working group are seen to be essentially sitting around absorbing the atmosphere of the institution — well, this is how they gain experience, isn't it? If the analyst of the same group then departs, leaving one productive programmer as the sole source of useful information on all that group's systems and setting work back six months, then, darn, a key person has left, everyone knows

and accepts this excuse. And so it goes.

Yet I must wonder: Couldn't this work be done well? Everyone assumes it is not possible to hold data processing activities to standards of predictability and cost control according to real function, which applies to everyone else. This is a matter of complete mystification. Perhaps by looking at the relation-

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Groups take this long to use new manpower because they choose to and because wasting time and territory-guarding have come to be their major organizational functions.

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ships in an applications programming group in light of the functions expected from it we will begin to see how productivity may possibly be improved.

Hierarchical relationship

All the programming groups I have worked in or heard about are dominated by the hierarchical relationship. Yet the functionality of this work has nothing to do with hierarchy. The activity of system building requires a well-defined, completely understood project context and close and constant communication of details. The hierarchical relationship as I have seen it operate results in partial project contexts for each programmer and inherently limited communication of critical details.

There is only one analyst, after all. If she spends all her time explaining things to people, she won't have any time left for her other responsibilities. This doesn't mean she won't try to be available, but say she is on the phone or at a meeting or with another programmer — the conscientious individual will avoid too much waiting around to ask his question. He ends up muddling around his problems the best he can. Hence, half his days are spent in unclarity and duplicated labor.

This kind of mundane and accepted loss of work potential is built into our hierarchical programming groups. Like unnecessary keystrokes among data entry personnel, questions unanswered until the next day result in very significant deterioration of work schedules among programmers.

In some programming work areas one can clearly see the hierarchical assumption in the floor layout, which provides tidy half-walled cubicles, each one containing, in addition to a desk and filing cabinet, two chairs — one for the authority and the other for the worker.

In organizations employing such floor plans, the obvious inferred work pattern is that the authority will go around to each worker one by one and explain what is to be done. And this is indeed what happens. If questions arise in any particular section of code, the process is reversed, with every point being resolved repetitively for every worker. Here,

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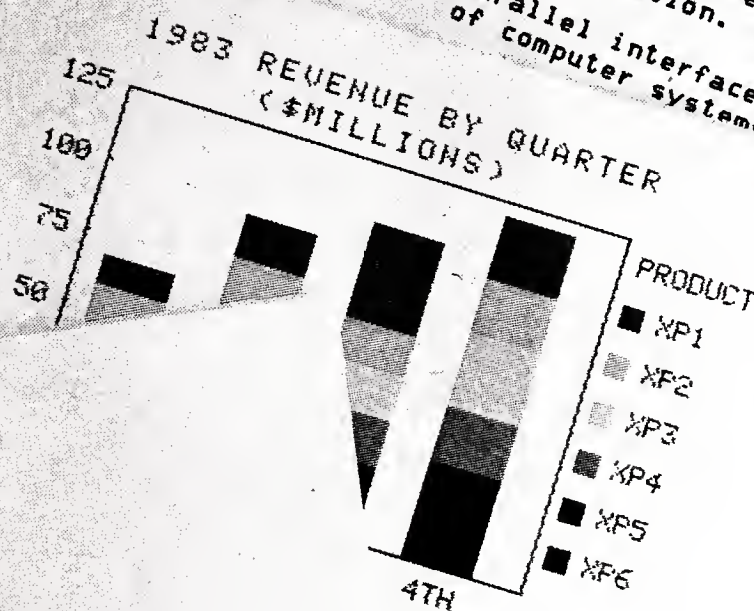
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November 12, 1984

Mr. Phillip Wallace
Bonwit Construction Company
60 East 42nd Street
Suite 2530
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Dear Mr. Wallace:

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IN DEPTH/ANONYMOUS PROGRAMMER

time is substituted for group understanding.

The isolation of individual programming tasks from purpose, history and function, which is what occurs when one analyst or senior group member communicates and designs and the rest carry out his dictates in program code, results in a lack of healthy redundancy of understanding. Only the key figure really understands what is going on here.

This programmer may know how to add the code "4" to his report; another programmer may be able to add a certain error message in case an unforeseen abend occurs, but only the analyst knows from conversations with the user what the code 4 really means or what input error caused the abend. Only the designing authority is qualified to change a series of system steps in order to accomplish reliably a user-defined requirement. Only he has substantial value and status in the company as a whole.

This situation generally turns the working population into the few with territory and the many without. The goal in such an organization is to get, not to share, territory, and woe betide the group whose "key person" ups and leaves.

Will the manager then consider giving his bright young people something substantial to design? This possibility is not likely as long as useful knowledge is concentrated in the hands of the designer. All the significant decision-making work will go to the veterans, who have company pensions and declining job-getting capacities to consider before cutting loose. Hence, this most revolutionary technology is typically in the hands of conservatives, and our systems tend to be relatively dated and ponderous at the time of their design.

High-priced experts

Not the least ill effect of this sadly ill-considered division of labor is the boon it provides programming contractors by its high overhead. If a programming manager really needs to get some work done, he typically admits the sterility of his own operation by calling in the high-priced experts. They can at least get a job off the ground in a relative hurry. Their basic lack of interest in any organization, however, will manifest itself for years in scanty documentation and difficult maintenance work for the real employees, who must now cope with a system that they have not written and probably do not like.

Where lies the superiority of these fly-by-night moguls over the faithful in-house employees? Perhaps they know the next software protocol on the horizon — com-

munications or some relational data base or whatever — but in this case, shouldn't one's own people be given the chance to learn?

Any programmer who has worked awhile knows that the particular vocabulary of a language is a hugely overplayed difficulty in any case. It may take 10 days to teach someone a useful amount of command-level CICS or some data base management system, and not very much longer for anything else in the

realm of business applications.

Are these people just smarter than one's own employees? Then why were these people selected and hired in the first place? Just how can one justify the expense and employee demoralization involved in the hiring of outside, apparently "superior" personnel, when it is plain to anyone who is paying attention that half of one's own permanent employees are doing practically

nothing at any given time?

The only reason contractors are used is that the resident groups have such limited design potential and such small production capacity that independent programmers, working in unaccustomed surroundings at inflated prices, can get more done more cheaply. This situation is an astonishing indictment of current programming practice, yet the use of contractors for the most difficult and substantial proj-

ects is widely accepted as a management necessity.

The normal application group structure is at fault in the high expense and lack of timeliness associated with systems products from the standpoint of corporate users. The problem with the structure of the application group has been located at the point of its hierarchical assumption, defined as the attitude that a few personnel shall properly understand, communicate, define and



IN DEPTH/ANONYMOUS PROGRAMMER

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This revolutionary technology is typically in the hands of conservatives, and systems tend to be relatively dated and ponderous at the time of their design.

design, while the majority of workers shall merely accomplish segments of the general plan.

This assumption results in a lack of necessary information for the programmer, both as to the broad ideas characterizing the system on which he is working and the specific details on which his logic hinges.

Also, the programmer in this working role becomes demoralized, as he has been trained to take pride in con-

cept and accomplishment and not rote labor; he is underutilized, as the designing authority cannot keep up with the functional communication required to keep his programmers seriously occupied; he does not have adequate status in the company as a whole; he is made to feel inferior by the hiring of higher paid contractors to accomplish the badly needed projects; and finally, he either accepts a rather unproductive role or seeks employ-

ment elsewhere. His lack of productivity is not evidence of any lack of capacity, but of the lack of imagination and functionality of the accepted group structure in which he works.

Those who are satisfied in such a role will persevere with the company and end up doing the designing, while the bright and frustrated ones will likely go through a series of jobs before finally turning their talents over to contracting firms in hopes of finding serious and intelligent employment.

Now consider the possible workings of a more functional group structure, one that would improve programmer productivity and restore energy and initiative to a moribund and systematically depressing area of work.

Bridge building

The job of applications programming is in some ways like building a bridge. This bridge is to stand between stored information and used information. The bridge is a complicated one with many levels for traffic and intricate entries and exits from level to level. It is too large for any one person to build; in fact, it requires a large work crew.

And yet when it is finished, it must function as though it had been built by one person in these respects — it must all fit together harmoniously, the entries and exits between levels must connect the levels in a consistent way so as not to mislead the traveling information, and the signs must all be in the same style.

This is how we think about our data processing systems. We divide labor between designers and concrete pourers, between foremen and truck drivers, because nobody can design a bridge and drive a truck at the same time. This is just common sense and the way of dividing work since Egypt.

This is a mighty funny bridge, however. Thinking about how we build this bridge is a little like thinking about subatomic physics. In the first place, steel girders in any possible configuration have already been driven into the riverbed. All we have to do is choose a desired configuration and indicate it on our little designing machine, and that precise configuration becomes operational, relegating the infinite remaining number of predriven girders back to the realm of the merely possible.

Any number of cement trucks are available to us. They all already contain perfectly mixed cement. The same little designing machine may be used to dump any amount of cement anywhere on the bridge we like. Likewise with signs, toll-booths and road stripes.

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Other aspects of this bridge-building activity bear scrutiny. The bridge is amenable to change on demand, say, if the governors demand more exits from a certain level or even extra levels.

This bridge is so complicated in its traffic patterns that it is possible for misunderstandings to occur all-around as to how one level connects to another or for everyone to forget entirely some necessary sequence of routes across it, making it

necessary to study the plans long and hard to rediscover this pathway. Some exits inadvertently may even end in cement walls, into which all traffic may crash for weeks or months until this problem is finally discovered by a maintenance man and remedied!

This bridge needs understanding more than it needs sturdy backs to drive steel girders, because the girders are already driven. It needs clear communication and

definite agreement between designers, and it needs well-considered and clear plans, but it does not need any cement truck drivers at all.

The only human work on this bridge is predesign planning, design formalization and design recording. All software is a formalized design for a process. We tend to divide this design up into higher and lower levels for the purposes of division of labor, but the line of demarcation between the two is ar-

tificial, arbitrary and destructive of the general knowledge about the system in question.

Our present applications groups tend, in practice, to assign the analyst and one key programmer the predesign, design and design recording tasks, while sending the other two or three group members out to drive the cement trucks, that is, do a little assigned coding. Only one programmer tends to be heavily utilized because by

restricting her necessary communications to one worker the analyst finds, under the hierarchy assumption, that she can get more done. Communication is the major burden on her time.

Thus, on the face of it, our typical programming groups waste half the manpower at their disposal. Actually their inefficiency is even greater than half. For programmer productivity to increase meaningfully, we must develop methods of group design that produce data systems satisfying the requirements of fitting harmoniously together, not misleading the traveling information, and having signs all of the same style.

Corporate design

The task of corporate design has always been neglected in our industry, and yet it is the main requirement of sound system development. Applications programming has been produced despite the method of its production, one could say, using the efficiency of the processing machinery to cover for unwillingness to develop efficient methods of system development.

We have jammed an old, hierarchical idea of a working group into an entirely novel technology, and it does not work at all. We have never been forced to make the programming group work very well because high expense and uneven usefulness have stood for years as accepted standards for our work.

The ideas of individualism and corporate territorialism have been institutionalized in programming groups and, because of the interconnected and knowledge-intensive nature of the work of programming, have stifled that work universally.

Everyone accepts this situation and looks to new software and novel corporate enticements to the individual when they consider programmer productivity. Yet these approaches do not address the question at all. The question is how to build group identity, group morale and group design capacity in our programming groups.

Directions for reform

I'd now like to suggest the makeup of a more effective programming group. This task is harder than a critique of the present structure and productivity of the application work group because I've never seen an effective programming group. Yet experience with the day-to-day functions we carry out can indicate directions for organizational reform.

Several aspects of the structure of an effective programming work group are rather clear. First, it must do away very definitely with the notion that one person



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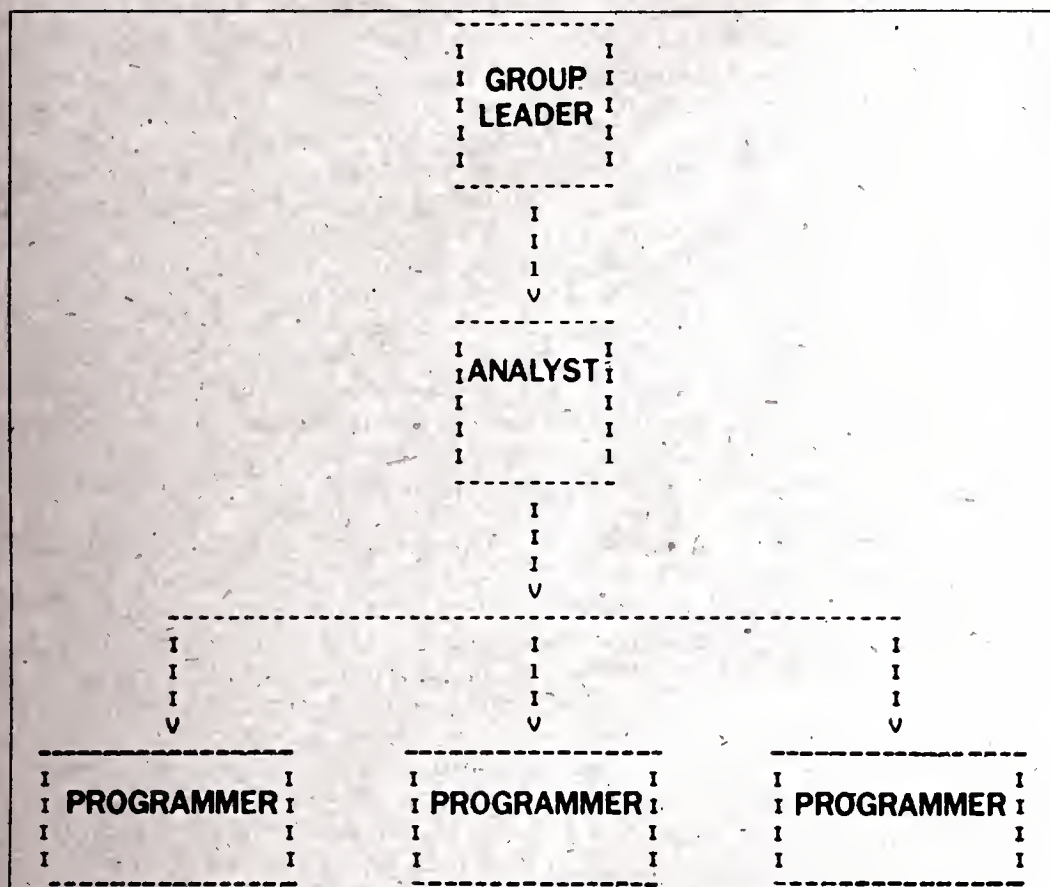
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Hierarchical group

designs, communicates and is responsible while others drive the cement trucks. Everyone designs, everyone communicates, and everyone is responsible. Our people are highly educated enough and disciplined that we can certainly develop procedures for joint design. On such methods hinge any attempt to bring the programming group to life.

Second, an effective group cultivates working meetings. People should grow accustomed to talking comfortably about work matters face to face and making operational decisions in a meeting room. Speech is, after all, a very fast, inclusive and accurate means of communication, which, in our present practice, is quite constricted where not entirely absent. Talking in a disciplined way tends to coordinate efforts, whereas written requirements tend to separate work into individual parcels that will require further communication later on for reassembly into a useful whole.

Third, an attempt to restructure the work group will not cost anyone his already-accomplished status. Analysts will remain analysts and will retain senior standing. It is the other crew members whose status must be changed and that for the better.

Fourth, the reformulated group, in its newly found unity of function, will be able to take a more aggressive

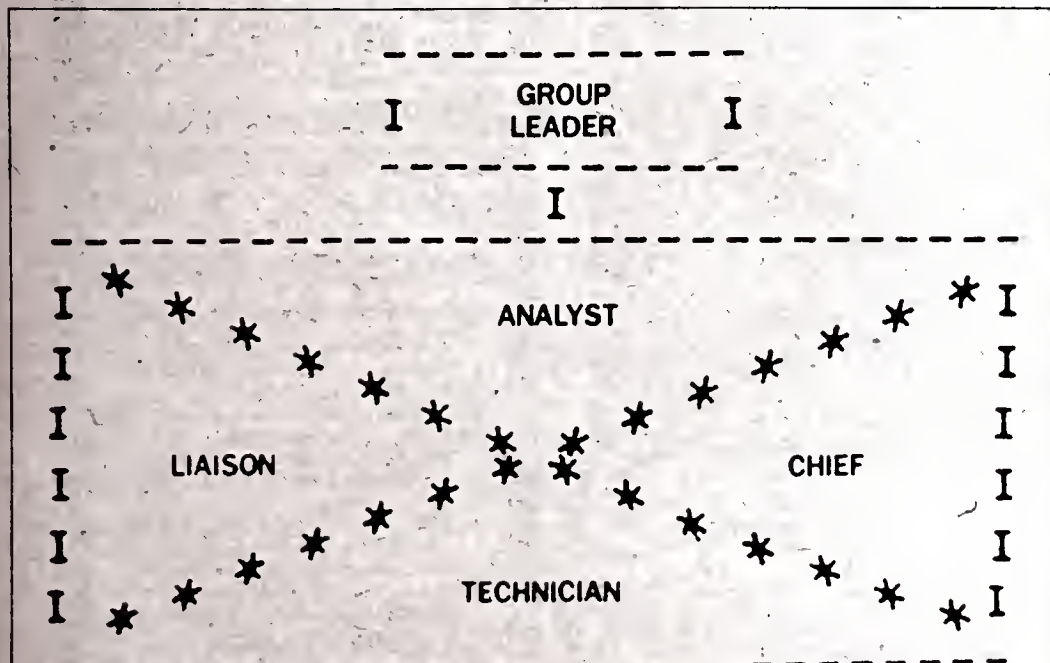
stance with respect to its own future. It will have the capacity to weigh the effectiveness of the system it supports and project future developments for those systems. Under our present hierarchical organizations, the group more or less does what it is told, without its professional judgment being respected or utilized.

Sharing decision making

This situation occurs because the management of the user department is characteristically organized to plan and make decisions, whereas we programmers are not. But if programmers were to develop a capacity for informed and timely recommendations, could we not save our companies a lot of money and bad decisions, while substantially raising the general level of available data processing services?

Fifth, the restructured group will maintain individual programming prowess. Working together at some times, the group members will also work better alone. A necessary balance in the workday will have been achieved, as well as an improvement in the critical judgment and contextual information available for the day's programming activity.

Let us here set out the contrasting models of the traditional programming group and the functionally re-



Integrated group

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The liaison programmer is in charge of operational communications with areas outside his group. He answers the phone on the first ring all morning. He keeps day-to-day relationships with the user departments squeaky clean and acts to shield the group from as much phone annoyance as possible.

conformed group that we are proposing.

In the integrated group, each employee has a special responsibility for one aspect of the group's function.

The technician programmer is the expert on the application of the relevant software vocabulary. She is the one to go to for answers on JCL use, CPU time utilization, the relative efficiency of various I/O procedures and the like. If she doesn't know everything, she takes special pride in keeping available every scrap of necessary reference material, including manuals, texts, cards and her own school notes. She will call IBM in White Plains, N.Y., if it comes to that. She is regarded by the group as the sum total of amassed data processing knowledge.

The liaison programmer is in charge of operational communications with areas outside his group. He answers the phone on the first ring all morning. If phone calls break into group meetings, he is always the only one whose attention can be

spared to evaluate the urgency and importance of the call. When a group's work interfaces with that of another group, he sets up the meetings and oils the edges. He keeps day-to-day relationships with the user departments squeaky clean and acts to shield the rest of the group from as much phone annoyance as possible.

Kindly bulldog

The chief programmer is a kindly bulldog. She insists that things get done. Her role is actually the management function within the working group. She sets the agendas and stands up from time to time to lead the group meetings. She gets agreement on job schedules and remembers things that slip other peoples' minds.

Time is her bible, yet she is not shrewish but canny, not pushy but encouraging, not flustered but definite in her cajoling. She must judge the time spent on small vs. large matters, seeing that the group neither becomes totally immersed in the



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IN DEPTH/ANONYMOUS PROGRAMMER

one nor enchanted by the other.

The analyst continues to specialize in the fitting of available software tools to user needs, but rather than building all the large design frameworks himself, he gets good design out of group design meetings. He spends a lot of time standing at a blackboard asking, Well, shall we do it this way or that?

I have never personally witnessed a group design meeting, but this format must be cultivated if our programmers are ever to produce consistently work that is good, useful and well-understood. To cut them off from design participation on the hierarchy assumption is to render them permanently stupid and demoralized. But let all programmers have a hand in something more demanding than assigned coding, and they will feel respected by the organization

and begin to exert themselves. They will produce code much more efficiently because of a close understanding of the system context, and management will no longer depend exclusively on one "key person" for useful knowledge about a given system's operation.

The group leader continues to do what he currently does in a typical large installation; that is, protect the group in the corporation, attend meetings on the group's behalf, submit attendance reports, conduct performance reviews and recommend areas of concentration for the group's activities.

Everybody in the working group writes code, in principle, in addition to his special functional status. This way everyone understands what cement is being talked about. If an analyst has not coded in 20 years

and does not intend to start now, fine, we can work with that. But in principle everybody has coding responsibilities.

Now, what have we accomplished with this redefinition of jobs? We went in with one overworked analyst, one overachieving, productive programmer and two hangers-on and came out with four definite and unique functional roles. Each of these people is necessary to the group's daily functioning in a highly visible way, yet none is indispensable. This sort of functional concentration of labor could give rise to a lively give-and-take spirit in a group. An employee would certainly hesitate to leave this type of group in favor of the old, isolated, programmer-behind-a-wall style of another organization.

Whereas all of the steps of system

writing and system maintenance are done individually in a group functioning under the hierarchy assumption, an integrated group could in large part take care of the various steps in these processes corporately.

Meetings under our accepted group protocol always stop short of practical doing and hence are avoided whenever possible. Meetings held only for reporting purposes can have only one useful result: the establishment of the lateness of the various parts of a project. If everything is coming along as per schedule, the meeting may as well not be held.

The new group breaks through the "doing barrier" in its meetings, and these meetings may then become supportive of the individual effort by putting individual assignments into complete context and through an exemplary style of rapid problem resolution.

The working meeting begins at some reasonable hour in the morning by which time all the group members can be expected to be present. Perhaps the liaison programmer has been in for an hour or so to take problem calls, but nobody's work really gets going until the meeting defines the day's requirements.

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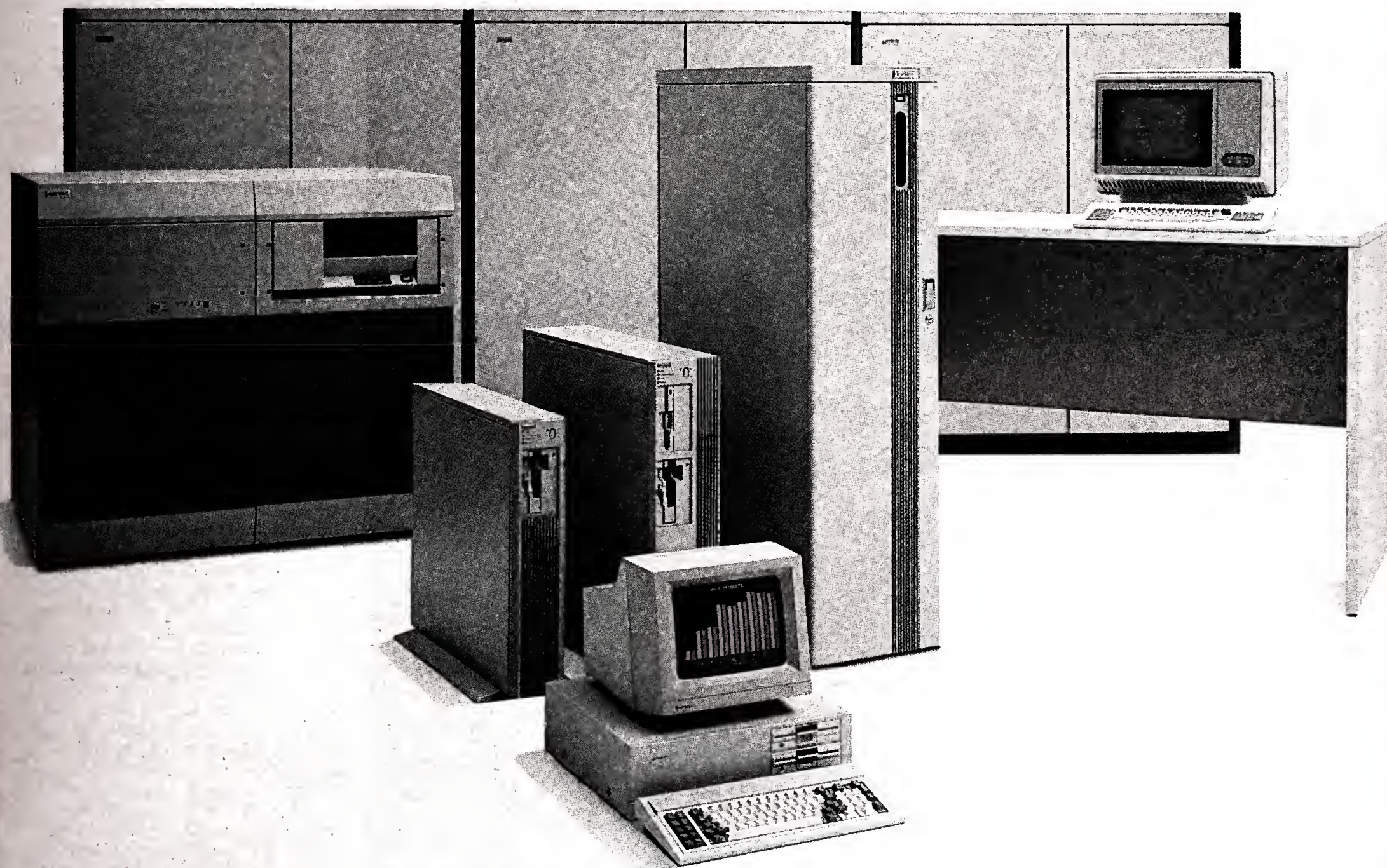
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IN DEPTH/ANONYMOUS PROGRAMMER

problem as bad data of a nature that was missed by the edit program. The technical programmer, the analyst and the individual who wrote the original editor huddle around the program listing and discover where the new edit check should be coded. Someone gets on the CRT terminal and makes the change. Someone else looks over his shoulder to make sure he doesn't forget a period.

The liaison calls operations to request the rerun, the forms are filled out for turning over the new version to production, and the problem is surmounted.

Under this method of problem resolution, the sum total of the group's knowledge and experience is brought to bear on all difficulties of this nature. Everyone is paying attention, because at this time of the morning they are relieved from all

their other duties. Problem resolution is timely because communication is comprehensive rather than serial, because everything is out in the open so stalling becomes apparent, because the group working together takes pride in a style of prompt competence and because every irksome detail is completed there and then.

Notice that under such a protocol all members of the group witness and experience the practical workings of the systems for which the group claims responsibility, whether or not each one participates in each maintenance activity. Larger maintenance requests may be assigned to an individual for programming or to the liaison for clarification or to the analyst to bring up during the design segment of the meeting.

After this initial flurry of problem

solving, the group takes a morning break for coffee, a little walk or personal phone calls. The immediate tensions of the working day have been alleviated. Minds can now be cleared for calm and thorough system building.

The design segment of the working meeting begins with the chief programmer setting a context for the projected activity, reminding everyone about the values to be held in the proposed systems and the time frames involved and speaking in general to the mood of the group. Perhaps she tells a joke; perhaps she waives her speaking role entirely — but she has the job of readying the participants, in whatever way necessary, for their next task.

The analyst then takes over, drawing on the blackboard and handing out system design materials.

System planning takes the form of respectful and disciplined discussion. Everybody's opinion is considered. Serious disagreements can result in tabling the issue until the next day or decision by the analyst on the weight of the arguments. Voting would be useless in such a forum, having nothing to do with knowledge and tending to divide the group into competing factions. Professionalism precludes taking any one element of a proposed design too seriously.

Again, everyone's experience is brought to bear on the group problem, and discussions yield quicker and more definite results because of their inclusive rather than serial format. Good design is accomplished by calm and thorough attention, as opposed to the situation currently prevailing, where frequently the analyst is racing faster than he should in his system design in order to stay ahead of the hungry programmers.

Coordination and assignment of various programming tasks also take place here. If someone is having more trouble than he feels he should in his individual work, he may ask for the attention of the group to resolve his problem. The method is flexible and pragmatic, and definite decisions are made and put into practice.

For the remainder of the working meeting, future system development is considered. Perhaps the liaison programmer has heard that vice-president Smith is dissatisfied with his present batch accounts payable system and is exploring available packages. Some conversation goes around the table as to the extent and requirements for an on-line system. The analyst agrees to spend time with the technician programmer getting together rough estimates about how this project could be done in-house. They agree to report back in a week, and the liaison is reminded to stay abreast of Smith's thinking as best he can. Then the meeting comes to an end, having taken about 2½ hours, and the programmers begin their individual work.

To those who contend that such working meetings would take too much time from coding activity, I would answer that nobody can code all day despite good motivation and context, and good motivation and context are generally lacking, lessening coding potential further. Under our hierarchical structure, a programmer can go for months without producing a good day's work, not by his own wish but because of unavailability of information and decisions. A few hours a morning would be very well spent indeed if the time were used to resolve small and immediate problems and get larger work areas started with good design and comprehensive communication.

A test group operating in the framework briefly described here would revolutionize productivity expectations in any medium to large shop. Further, such group procedures could stabilize personnel, spread useful knowledge and responsibility more equitably among programmers, give alert intelligence the chance to take the initiative, decrease reliance upon contractors and create better systems dramatically faster.

About the author

The author has been a programmer for five years, the last two at a major East Coast bank.

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IN DEPTH

Peter Benton, apostle of technology

By Susan Blakeney
Director, International News Services

Peter Benton is a self-proclaimed high-tech evangelist. The former director of British Telecom led its 250,000 employees through the organization's turbulent transition from a state-owned, state-run monolith to a publicly held communications giant, a kind of predivested AT&T.

Since leaving British Telecom in 1983, he has been butting heads with power brokers around the world, spreading the gospel of technology with all the fervor of a Southern Baptist preacher.

Benton believes a "true" Common Market in Europe can be achieved by standardizing telecommunications equipment. He believes information technology can lessen unemployment and that society must come to grips with the "information technology concept" in order to enjoy its benefits. Benton claims a full-fledged revolution is needed in the way society deals with technology.

Benton is currently a special adviser to the European Economic Community and also directs the London office of Nolan, Norton and Associates, an American consulting firm that conducts industry research and technical seminars. He was interviewed recently at one such seminar in Tarpon Springs, Fla.

What is your work as special adviser to the European Economic Community?

I concern myself most with the strategic framework for achieving a [technological] infrastructure in Europe. There are two particular areas: creating a pan-European advanced telecommunications network and achieving



IN DEPTH/PETER BENTON

full harmonization of standards.

Is British Telecom the UK's equivalent of AT&T?

It is the British equivalent of the old AT&T, yes. Since early December, the shares are about 51% owned by the general public. But prior to that, it went through several phases.

When I was first chief executive officer from 1977 to 1978, it was still an integral part of the Post Office. Then in 1981, there was an act through Parliament that separated Telecom from the Post Office and created a new public corporation, wholly owned by the government, called British Telecom.

The act also removed — or gave the secretary of state the power to remove — the monopoly. Soon after that, another carrier was licensed — Mercury.

”

It was really a pretty grim situation: The technology was out of date, the organization was monolithic and inflexible, and the unions were very powerful.

So British Telecom now is, in fact, a monopoly, even though it does not have a legal monopoly in the sense that Mercury is allowed to create networks itself. All the traffic is handled by British Telecom, because Mercury is so tiny that it has really not made any impact.

British Telecom recently lost a joint bid with IBM for Britain's nationwide packet-switching network. What happened?

British Telecom and IBM were making proposals for a new network called Jove, which would be, as originally proposed, initially based on SNA [IBM's Systems Network Architecture], but they committed themselves to making it OSI [Open Systems Interconnection] compatible when the full OSI standards were available.

That network has not been approved, and it is not going to be approved.

You were in charge at British Telecom during the changing of the guard from a government monopoly to a publicly held corporation. What did you accomplish during this period?

Well, I'd like to think I did quite a lot. When I first got there, the technology was entirely electromechanical. There were no electronic switches; it was all clickety click, bangedy bang and absolutely no digital. It was very, very antiquated technology, and the development work for the new range of switches — System X — was in some disarray. It wasn't being properly led, and they weren't getting results.

Also, there had been a government report in 1976 — the Carter Report — which pointed out that it [British Telecom] was very monolithic. I, as the managing director, had a quarter of a million people and absolutely no ability to delegate, because the organization under me was entirely functional. And so a lot of issues came up to my desk, and it was a real heavy work-load job.

It was also in the grip of the unions, and the unions were reflecting their members' fears of new technology and were standing in the way of infusing the technology. It was really a pretty grim situation: The technology was out of date, the organization was monolithic and inflexible and the unions were very powerful.

The first thing I did was a strange and interesting thing: Working with the unions, we put together an audiovisual on the impact of the new technology designed to remove the Luddite fear. The Luddites were the people who smashed up the hand looms in the early 19th century because they feared the new technology.

[The video was] shown to all the 140,000 technical people by their own manager with the union alongside. And that is because the union itself found that the fear of the technology was embarrassing the workers, just as much as it was embarrassing me.

Then in 1979, I did a very interesting thing that had never been done before: I took our 10-year strategic plan, which had been a secret document between me and the cabinet, and I printed 40,000 copies of it without any explications. Every manager was given his own copy of the 10-year plan. And I printed 300,000 copies of a concise version, which every member of the staff was given. And I gave this plan to our customers and customer groups and to the suppliers, the press — everybody knew exactly what we were going to do.

And in that plan, I stated some goals for the creation of the advanced network. For example, one of the first goals was that by March 1983, the 30 major cities would be linked by digital transmission; that by March 1986, the 30 major cities would be linked by switched digital transmission; and that by 1990, the entire network would be digital, and there would be at least five million customer lines on ISDN [integrated services digital network]. We've already passed the 1983 goal, and by March 1986, we will have a switched digital network linking the 30 major cities.

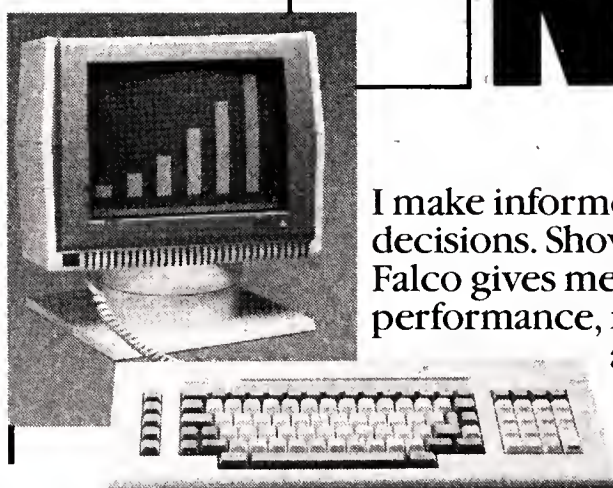
So that was the second thing I did: give the whole corporation a sense of direction and a sense of vision and

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goals. Then the next thing I did was that for five years; I personally selected everybody who was appointed to the top 300 jobs in the corporation, which meant I spent perhaps 1½ days a week interviewing people, because I was absolutely determined that the key posts in the corporation were going to be filled by leaders and not by civil service administrators.

In the old organization, they used to put up as their favorite candidates people whose skill was administering a system, not achieving results. It soon became clear to me that if I left appointments to the system, I would finish up with a lot of bureaucrats, and my organization wouldn't work. So I saved the top 250 to 300 jobs for my own discretion.

In terms of the advanced technology, I don't like to think just of Britain; I think it's a European thing. There's no question that a massive effort is being put forth on several levels. At the European Commission level, there's a program called Esprit, which is about \$1.25 billion worth of ideas.

The money comes 50:50 from government and private industry. And then that's matched by national projects — Projet National in France and the British Alvey program. What we're trying to arrange now is that Esprit should act in some kind of coordinating role for the various national programs.

Recently, five European vendors joined together, independently of Esprit and Alvey, to start their own research center. Why are there so

many divergent and independent research projects going on? Aren't you wasting energy and resources and duplicating efforts?

You can look at it both ways. In America, the joint national effort is quite slim. The only sort of general national direction that's given, I suspect, is from the Department of Defense. Obviously, Europe's approach does give rise to a lot of duplication. On the other hand, there is a great danger in very advanced research of putting all your effort down any particular line, because you may get it wrong.

So I think that I wouldn't claim that we've got the right system, but to try to be overly tidy may well result in leading a whole continent up a blind alley. There's quite a lot to be said for encouraging some national initiatives, so that if the French really believe very strongly in a particular line, for example, they're not forced into some pan-European program when they have their own resources to follow their own inclinations.

There's some very interesting work going on right now. The consulting arms of the 10 PTTs [postal, telephone and telegraph authorities]

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The chief executives are all too often just embarrassed by their ignorance, and so they don't expose themselves to understand what the technology can do.

have put together proposals for a pan-European network at three levels over a period of five years, and I'm sure that will happen. It still needs federal government support, but I'm sure it will come. So from the point of view of creating the infrastructure, Europe will be exemplary. The biggest question is whether European industry will actually use the technology and so create the added value.

But people are already using videotex and so much other technology, why would there be any question?

Well, it's an attitude. I chaired the Financial Times Electronics Conference last year. Two very distinguished Europeans there both made the point about the contrast with the U.S., where the users say, "Gimme!" They demand the new technology and inspire the producing industry to do new things.

You may have chaos in your system, but you also have market vitality. In the end, that's going to be what counts, because otherwise, having all this lovely technology and all these beautiful networks will just be fruitless.

I've been wondering what one could do to get companies in Britain and Europe to use the new technology. I thought the best thing I could do was to join the leading American crowd and do it company by company — just use one's own knowledge of the nature of the big corporations and the characteristics of the people who lead them (many of whom are my friends and colleagues from the past) and to link this to Nolan, Norton's qualities.

Perhaps this way I could assure a more healthy, more receptive attitude. But that's the big uncertainty, I think, in Europe: whether industry at large will seize the opportunity.

The financial industry is quite advanced, and I think the electronics industry is making use of technology

in the area of computer-aided design and manufacturing. But industry outside those areas . . . they're afraid. The chief executives are all too often just embarrassed by their ignorance, and so they don't expose themselves to understand what the technology can do.

What about the U.S. trade restrictions that are currently preventing European users and dealers from getting the equipment they need? The idea is to prevent the technology from seeping into Soviet Bloc countries, but there seems to be a lot of resentment in Europe of these trade practices.

That whole subject is one that is likely to get more complex over the next few years, because what we've seen so far are the problems relating to hardware, and I think that as the software gets more powerful, there may well be issues related to that.

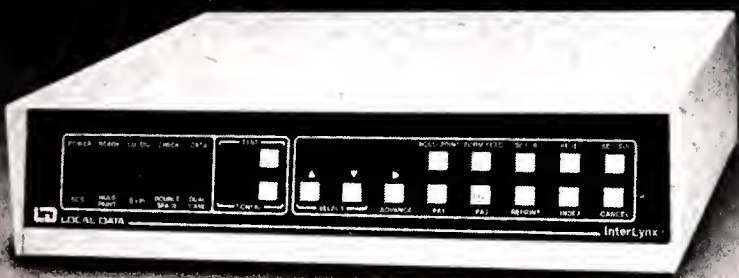
I think that what really upset the European manufacturers is a belief, which may or may not be right, that the U.S. Department of Trade is more expeditious in dealing with export licenses for U.S. companies than it is when dealing with export licenses for European companies.

There's obviously quite general appreciation of the Department of Defense's desire to keep the technology out of unfriendly hands. But I think what is upsetting is that the system has worked in a way that is discriminatory against non-U.S. companies. It does seem to me that it's pretty heavy-handed, too.

How does the U.S. Department of Trade keep European vendors from shipping to wherever they want?

It's not an area in which I'm a specialist, but many European systems incorporate substantial elements of U.S. equipment that have certain embargoes attached to them. Let's put it this way: I understand the concerns of the Department of Defense, and I have talked with people at very high levels there about it. But it is evident that the system now is regarded as unfair and damaging by many friendly companies and friendly countries. It would be a pity if that situation were allowed to continue unresolved, because it might do more damage to a very important relationship, the transatlantic relationship, than it resolves the issues

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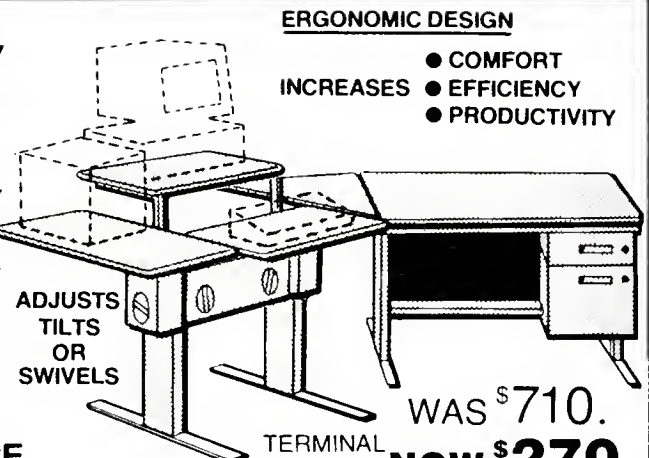
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IN DEPTH/PETER BENTON

perceived by the Department of Defense.

You've expressed the opinion that many workers in Europe are afraid of high technology. But at the same time, isn't high tech also viewed as a panacea for Europe's economic woes?

Many workers, submanagerial types, are nervous about it, and there are unions who see themselves as having a particular role in making people aware of the dangers. But there are encouraging signs that information technology is creating, rather than cutting, jobs.

At the higher level, I think European governments — certainly France and Britain and probably Italy — are very aware of the importance of information technology to their national economies. The real

problem lies with the chief executives of the general industrial corporations and the senior to middle management — their fear of being embarrassed by their ignorance.

It's always a bit of a problem in European industry that senior management distances itself from its troops and from its company. Senior managers are off in some executive-suite world in which everything comes through on bits of paper, and real life isn't encouraged to intrude. I think that's a very bad management style and very, very dangerous.

It's particularly dangerous when a revolution is required, because too many senior managers are out of touch with their companies and their customers, and they're nervous about being embarrassed, about the apparently arcane terminology of information technology.

So, one role that a person like me can play — and I'm not an information technology specialist, I'm a scientist and I run companies — is to act as the middleman between the world of the chief executive and the world of information technology. I think there's a need for that, frankly.

What change, technology or innovation do you consider the most impressive?

What really has impressed me most is the ability of people who appear to be dull and ordinary to respond with electricity when given a vision and a framework within which they can control their destiny. I think that gives a great hope. I still look back on my years at British Telecom as a very remarkable period. It is really quite amazing how

250,000 people who have only recently left the civil service could be this vigorous, sharp-edged, probing, creating, innovating group that one sees there now. I think that gives great hope; if one can do it with a quarter of a million people there, it can be done anywhere.

So it's the people thing, just getting the structure and volition, and very, very great things can be done quite quickly. In five years, you can have a *total* change in attitudes and achievement.

In terms of technology, the really exciting thing is the linking of computing and communications. In my view, the development that's going to be of the greatest utility to the greatest number of people has to be ISDN. There's going to be simultaneous text, graphics and voice communications. What the ISDN is going to offer is 144K bits down the ordinary copper wire into your house. There will be two 64K-bit channels.

Now one possibility is a 64K-bit switch — very low error. Down that one channel you can put compressed voice, you could send graphics and text, and you could use a light pen. So one of my visions here is that I could speak to you in Washington, D.C., or New York, start off conversing by voice and then say, "I'd love you to look at how we're doing in our network expansion." Then I would press a button and pull out of my data base the map of the European network.

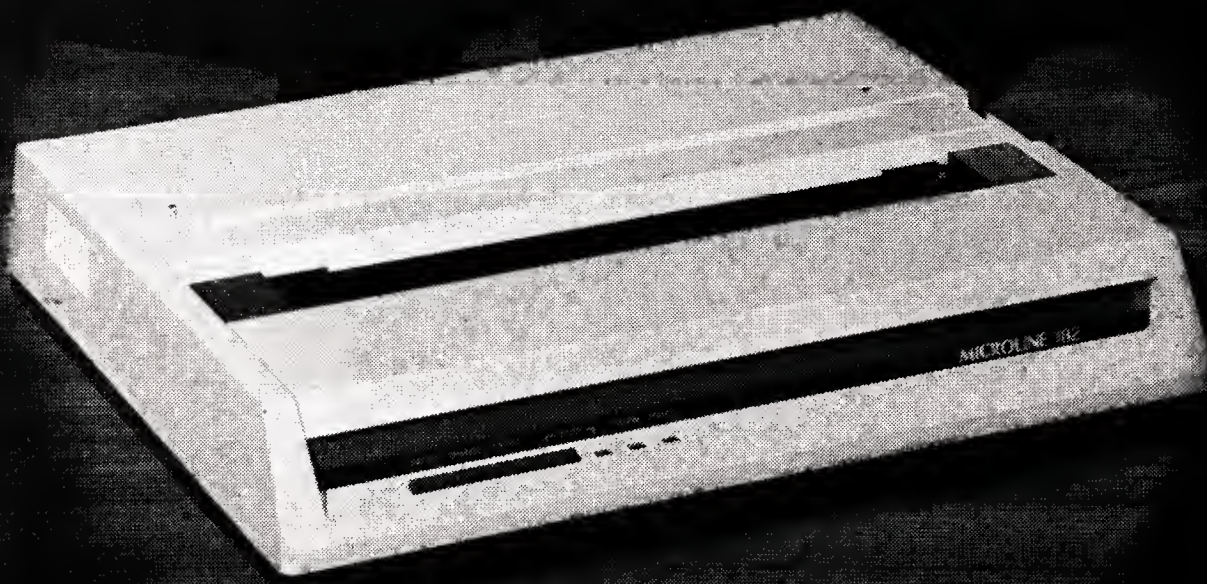
I press another button and send it to you, and then you see it there on the screen over the same wire as I talk to you about it. Then I take my light pen and I ring a bit, and as I ring it, it appears on your screen, too. Now I think that combination of voice, text, graphics and light pen communications, which is really going to be made possible by ISDN, is going to be a major utility to every person, not just to knowledge workers. It's going to change the way people communicate.

How fast is Europe moving to ISDN?

What's so pretty about ISDN is that first, it goes with the grain: All the PTTs, for their own internal and operating reasons, are switching over from analog to digital trunk networks. All are doing it, some later than others — Greece is 1995 or something like that, Germany is 1990, we're 1986 and the French are 1985. All of them are moving internally to digital trunk networks, and all of them at a slightly slower pace are moving away from analog local exchanges to digital ones.

The really important thing, the big issue open, is how to get 144K bits out to the customer. Britain's got 25 million copper wires out there, and digital communications needs four wires, not two. So, the technical question is how to get the equipment of four wires working over two wires [without laying] 25 million new wires.

When Britain says that by 1990 there will be universal availability of ISDN, what that means is that by 1990 there will be eight million digital lines on local exchanges. And every local exchange area will have some digital capacity. And there'll be a stock of several million black boxes wherever you are within five kilometers of a local exchange. You just have to say, "I want ISDN," and within two days, bingo!



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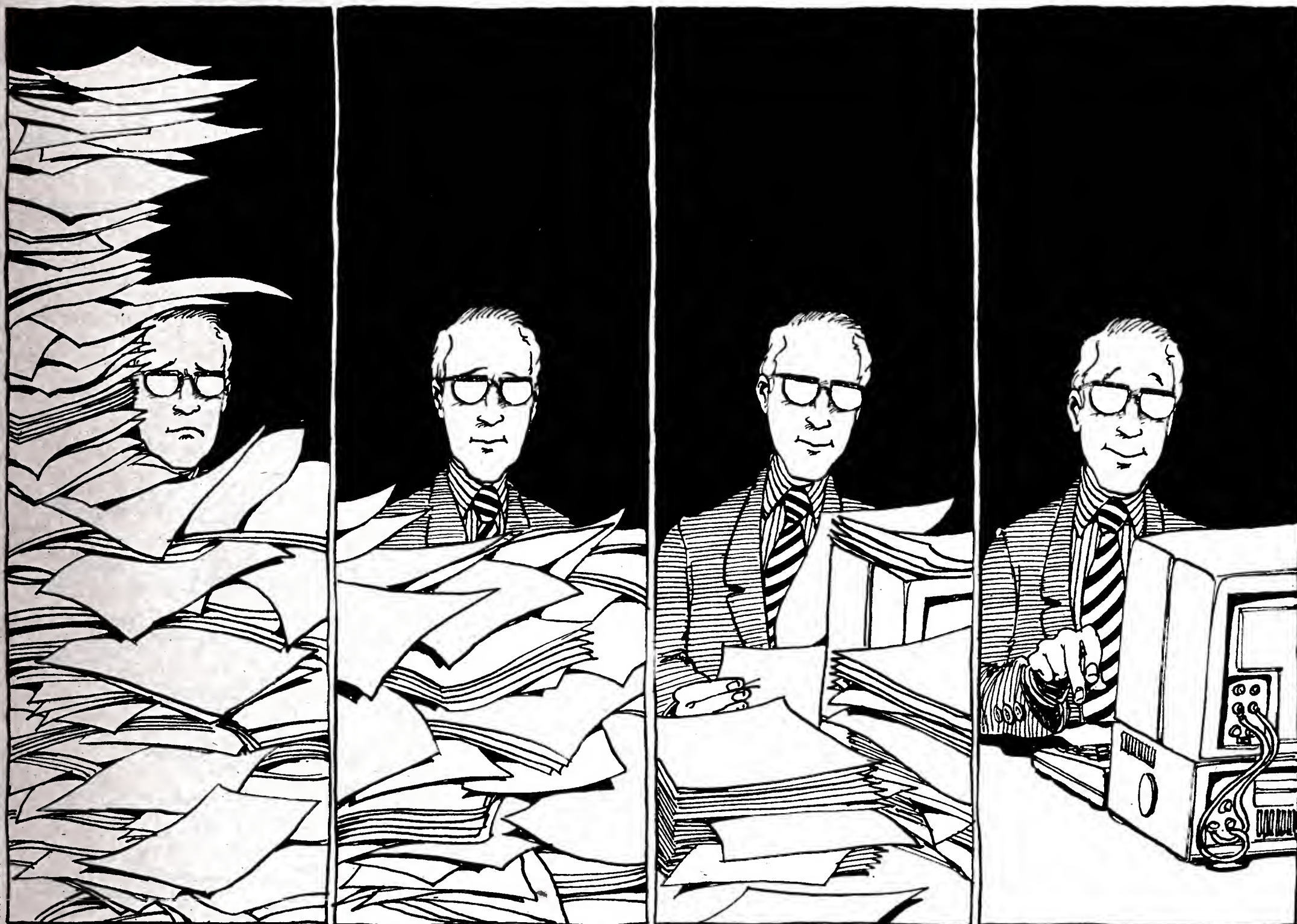


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Information payoff

The role of information technology, then, will be critical externally in setting marketing strategy and internally in defining organizational design. The chief executive will find a new role as the chief information strategist.

By Paul Strassmann

Until recently, the technical problems involved in getting computers to do what they were supposed to do at a reasonable cost — the supply side of the computer revolution — have overshadowed the question of whether computers were economically viable. I sense that a major alteration in emphasis is about to take place.

It will be a matter of only a few years before the demand side of the computer revolution will take precedence. Information technology will become so plentiful and so easily installed that management will be able to pay attention to economic

objectives rather than concerning itself primarily with the means of getting the jobs done. As this refocusing gradually takes place, the issues of investment levels, payoffs, efficiency and, especially, organizational effectiveness, will become paramount.

There are already good reasons to conclude that there is no direct and simple correlation between management productivity and information technology. They may in fact be unrelated. The preliminary findings of my research raise doubts about the assumptions that managements in the businesses I have sampled so far must have made when they increased their

computer technology budgets in pursuit of improved productivity:

- Computers will not make a bad business good.
- Automation is a great cure, but it is not a panacea.
- A bad strategic situation cannot be corrected by automating it.
- Automate success, not failure.

This testing of the concept of management productivity based on value added was completed late in 1983. Forty businesses signed up

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The SAS System...

Are your users demanding faster service and more business expertise than your data processing staff can offer? Is your DP staff demanding relief from its applications backlog? Is your management demanding lower development and maintenance costs? Put the SAS® System in your Information Center and you can meet all these demands.

“The SAS System is the one, completely integrated software solution to meet your Information Center needs.”

The SAS Solution for End Users

Your marketing staff can use the base SAS® product for sales reports and analyses. Sales representatives can use the full-screen capabilities in our SAS/FSP® product to manage their prospect files and the personnel department can keep track of employee and applicant records.

April 4, 1984

Ms. Margaret Wells
Department D
4905 Dana Drive
San Jose, CA 95126

Dear Margaret:

We are in the process of updating our employee information file. Please take the time to verify the information we currently have on you.

Employee Number: 109449
Employee Name: Ms. Margaret Wells
Department: Marketing
Birthdate: 04/25/57 Sex: F Marital Status: S
Number of Dependents: 0 Social Security Number: 242-23-3943

Home address: Apartment D
4905 Dana Drive
San Jose, CA 95126
Home phone: 555-7634

Information about Employee's Spouse:
Spouse's Name: N/A
Spouse's Employer: N/A
Work Phone: N/A

In case of an emergency, please call:
Mr. or Mrs. R. W. Wells
209 Trail in the Pines
Wilmington, NC 28402
919/555-1234

Insurance Information:
Type: Health/Medical
Life: Blue Cross Blue Shield
Life: Blue Cross Blue Shield
Life: Blue Cross Blue Shield

Please verify this information and return to me by May 1, 1984. If any of the information is incorrect, please make the changes on this form.

Thank you for helping to keep our files current.

Sincerely,
Sally Lingo
Human Resources

STAYTON
Manufacturing Corp.
1111 Highway 101
San Jose, CA 95128
(408) 555-1234

Command ==> _ Edit SAS data set: EMP.INFO

Employee Information

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Employee Name: Ms. Margaret Wells
Department: Marketing
Birthdate: 04/25/57 Sex: F Marital Status: S
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Sincerely,
Sally Lingo
Human Resources

The accounting staff can quickly produce budgets and spreadsheet reports.

Revenue Accounting Summary
for Fiscal Year Ending 1983

Revenue Source	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	298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The Solution for Your Information Center

The SAS Solution for Programmers

Once your Information Center is equipped with the SAS System, your DP staff is free to use SAS programming tools to develop complicated reports and analyses, measure hardware resources or system usage, and accomplish many other jobs. Data base administrators can use our SAS/IMS-DL/I® interface to build test data bases and DL/I programmers can implement their IMS-DL/I applications using the simple SAS language.

And with our new SAS/REPLAY-CICS™ tool, your DP staff can develop and store SAS/GRAPH displays in overnight batch jobs, then give them to managers for easy, orderly replay on their CICS terminals.

STEVEN MANUFACTURING CO.
VSE SYSTEM USAGE BY DEPARTMENT
FOR APRIL 9, 1984

DEPARTMENT	JOBNAME	NUMBER OF EXECUTIONS	CPU MINUTE		I/O COUNT	
			SUM	MEAN	SUM	MEAN
ACCOUNTING	JACCT110	3	31.32	10.44	11372	3791
	JACCT110	7	38.97	5.57	34968	4995
	JACCT220	8	103.95	12.99	74237	9280
	OTHERS	25	113.76	4.55	56085	2243
HUMAN RESOURCES	OTHERS	18	31.00	1.72	50314	2795
LEGAL	OTHERS	16	17.00	1.06	8218	514
MARKETING	JMKTG170	3	31.25	10.45	13557	4519
	JMKTG200	9	145.36	16.15	159131	17681
	JMKTG215	8	82.33	10.29	43748	5469
	JMKTG220	7	67.01	9.57	132357	18908
PLANNING	OTHERS	21	89.95	4.28	100880	4804
PRODUCTION	OTHERS	17	43.00	2.53	27419	1616
SYSTEMS	JPROD200	12	80.47	6.71	107271	8939
	JPROD300	7	170.00	24.29	89020	12717
	JPROD650	4	58.35	14.59	91561	22890
	OTHERS	24	142.18	5.92	108352	4515
ALL JOBS	JSYS525	4	38.47	9.62	22519	5630
	JSYS620	4	24.62	6.15	39212	9803
	JSYS700	4	47.36	11.84	41780	10445
	JSYS850	4	49.67	12.42	40256	10064
	OTHERS	17	33.88	1.99	114291	6723
		222	1440.00	6.49	1366608	6156

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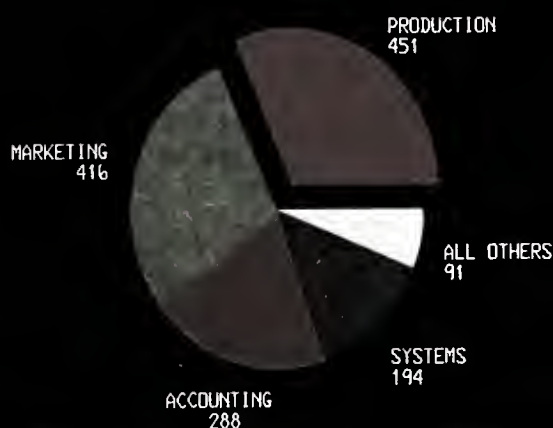
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for the pilot program. They provided detailed data covering the period from 1978 through 1982. Altogether, 200 measurements — each supplemented by information on more than 100 variables describing the businesses — were entered into a research data base maintained by the Strategic Planning Institute.

The primary purpose of the pilot program was to validate the value-added concepts and to test the analytical techniques that link management productivity to information technology. The secondary purpose of the research was to explore whether and how information technology was affected by the strategic position of the businesses.

The research findings apply only to the 40 companies' experiences over the five years under study. The pilot program had only limited data,

even though the sample is large enough to be representative of what one may expect in further study. The results are adequate for validation of methodology, but certainly not sufficient to establish definitive rules.

In the absence of any comparable research, the pilot study results are, nevertheless, indicative of certain significant trends:

■ *Information technology, as a percentage of management costs, continues to rise.* The median information technology expenditure, as a percentage of total management costs, was found to be 8%. However, total management costs also include external purchases. Therefore, the more meaningful comparison relates information technology expenses to management wages and salaries. The ratio of information technology-related costs (which includes comput-

ers, telephone services, programming and similar services) rose from 21.5% of management labor costs to 28.2% over a five-year period for the users in the top quartile. In such firms, information technology became a major share of the administrative cost of conducting business. Such high levels of expense were totally unexpected.

■ *Information technology costs showed no correlation with management productivity.* A large number of companies spent less than 10% of management costs on information technology, while delivering 2.0 or better productivity results. There was an equivalent number of companies that spent between 22% and 41% of management costs on information technology while experiencing poor productivity. Then there were companies that spent well over

50% of management costs on information technology. They had, on the average, high productivity — but one could also find instances of very high, as well as below-average, productivity in the sample.

■ *Year-to-year increases in information technology expenditures showed improved management productivity if the companies' strategic positions were superior to begin with.* In businesses with an already well-established strategic potential, measured in such terms as market share, product quality or utilization of assets, information technology investments paid off nicely. Year-to-year increases in information technology expenditures were correlated with year-to-year increases in management productivity. Underperformers either did not show improvements or actually deteriorated. Companies with an inferior strategic position showed declining management productivity even with increasing levels of information technology costs.

"The rapidity and ease with which text can be moved electronically and then displayed on a [video display unit] has led to the unwarranted conclusion that the 'paperless office' is one of the primary characteristics of office automation."

The frequently quoted book *Toward Paperless Information Systems* is just one indication of the tremendous interest in developing computer systems that would do without paper. Getting rid of paper is an easily articulated objective. Many leading executives take this objective quite seriously as a simple way of expressing what they are trying to accomplish by computer investments.

In January 1982, I heard the chairman of one of the largest U.S. insurance companies make the pronouncement that by the end of 1983 his company would be free of paper. Although the insurance company did eliminate huge numbers of unnecessary forms and install new computing equipment, there was no noticeable difference in the total amount of paper used in its offices by December 1983.

I think that the chairman was simply appalled by his excessive administrative costs. He should have realized that paper is actually quite cheap and that the truly excessive costs are caused by unnecessary labor expenses. The chairman should have motivated his organization to remedy that problem if he wanted lower administration costs. By going after pages of paper instead, he pursued a merely symbolic goal.

Zealous pursuit of such displaced, instant remedies can actually cause an increase in costs; the effort expended in chasing after pieces of paper may divert attention from the real problems of unresponsive customer service and ineffective organizational design.

The Federal Paperwork Reduction Act of 1980 actually legislated the elaborate annual counting and reporting of pieces of paper eliminated from government transactions. Counting pages of paper while overall costs are escalating and the scope of the government's activities is changing may be of some use.

But it avoids dealing with the more fundamental questions of evaluating the actual results delivered by

In automating an office, one must often choose between piece and harmony.



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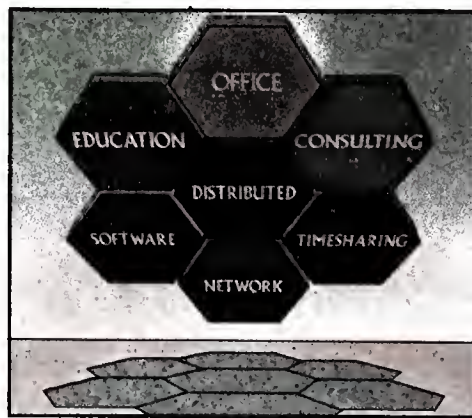
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a government agency. I have examined the annual paperwork reduction reports and found them inconclusive, to say the least.

In an effort to clarify what is fact and what is fiction about the paperless office, I will examine both the economic and the human factors involved.

There is a relationship between the method of office communications and the use of paper. The economics of paper consumption changes with electronic printing.

Office paper usage, per information worker, has been growing steadily since 1946 at a rate about double that of the growth of the GNP. My projected paper-consumption estimate, per information worker, for 1992 is 24,600 pages per year. It is a conservative estimate because occupational shifts continue to favor those personnel who use a lot of office paper. For instance, operations labor — which uses only small amounts of office paper — continues to decline, whereas professional and technical manpower (notorious glut-tions for paper, at usage rates of more than 300% of the average) — continues to increase.

We can feel safe about our forecasts of increased paper consumption in the office because of the proliferation of the means to make copies. The number of data processing high-volume printers will most likely increase from the current 250,000 to more than 420,000 by the end of the 1980s. A substantial growth in office printers is also anticipated: from 2.1 million in 1982 to at least 11 million in 1988.

I view electronic printers as highly efficient engines for low-cost printing on paper. More printers certainly generate more paper copies. Moreover, the rapid introduction of VDTs actually promotes the making of copies because VDTs are a very effective means of generating originals. Inexpensive originals breed conveniently produced and inexpensive copies. Copies require paper.

In 1983 I appeared before the American Paper Institute at a meeting devoted to exploring the future impact of electronics on the paper industry. Preceding me on the platform was a consultant with a well-established reputation as an expert on the office of the future. The expert's conclusion was that the VDT screen is so efficient as a means of manipulating text and graphics that people will make much less use of the printed medium in the future. His presentation included about 60 transparencies that he, himself, produced on his personal graphics computer.

To illustrate his point, he noted that at least 240 sheets of paper were saved in the process of preparing his presentation as compared with his prior approach, in which he had to employ a graphic artist to prepare the visual aids. I noted that an unusually large number of transparencies were used during the presentation. The expert agreed: There were so many because they were so easy to produce, he said.

This brought the net savings, based on comparison with old methods, down to only 60 sheets of paper. However, the presentation was executed with such skill that all of the 180 attendees wanted copies of each chart. The result was a net increase

The presentation was executed with such skill that all of the 180 attendees wanted copies of each chart. The result was a net increase in consumption of more than 8,000 sheets of paper because of the creative use of the electronic medium!

in paper consumption of more than 8,000 sheets of paper because of creative use of the electronic medium!

Another way to check on our projected growth rates is to look at the fastest growing part of the office business: computer paper shipments per billion dollars of GNP. Such shipments increase at an 8% compound growth rate. Electronic printing has

generated an enormous capacity for printing information at a materially reduced unit cost.

Large organizations are not growing. Nor do they employ ever-increasing numbers of office workers.

One of the theories frequently offered to explain the steady growth in

the number of office workers is based on the idea that larger organizations require increasing amounts of information to achieve improved coordination. If this assumption is correct, one should find an increasing proportion of employees engaged in information occupations as the size of organizations increases.

A recent study of this relationship revealed that the fraction of information workers declines as organizational size increases. Similarly, the fraction of managers declines as organizations increase in size from less than 20 employees to more than 1,000 employees.

The trend is unmistakable: Larger establishments employ relatively fewer information workers than smaller establishments. Very small establishments also classify twice as many of their employees as

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managers as compared with large organizations. One way of interpreting this data is to assert that larger organizations are more efficient. Another way of looking at the same statistics is to argue that in smaller organizations, more people can make important decisions. Still another explanation is that smaller organizations are more frequently found in the service sector of the economy, where more managers are required to get the work done.

These facts appear to contradict each other, because they describe only the surface of much deeper changes in employment patterns and in economic performance.

One key to understanding the divergent trends in information employment, organizational size and profitability is to observe how organizations employ information workers as they grow. In small service establishments, for example, most employees are information workers. As service establishments grow, however, they reduce their information worker employment even more rapidly than manufacturing establishments. Consequently, the growth in the number of information workers could not have come about through the needs of large corporations.

The opposite seems to apply. The growth in the number of small service firms has been the principal stimulus to the creation of new jobs for information workers. We employ more information workers because the economy has favored smaller organizations as well as information worker-intensive sectors such as consumer services, government, health and education at the expense of concentrated industries.

With most current economic growth taking place in the service sector, which presently accounts for 71% of total employment and 66% of the GNP, the increased demand for information workers and management personnel is assured.

An increasing proportion of costs for items provided by the goods-producing sector (such as agriculture and manufacturing) is attributable to service intermediaries. When one examines a \$2 packaged food item in the supermarket, perhaps as little as \$.20 of its price is directly assignable to the goods-producing activities in which farmers, food-processing workers and transportation workers are directly engaged.

Administrative (information processing costs) are tagged on to the price as the product moves from the field to the refrigerator. Produce brokers, produce shippers, receiving and inspection clerks, quality-control inspectors, accountants, auditors, factory managers, warehouse managers, warehouse clerks, packaging-materials designers, brand-advertising agents, shipping dispatchers, supermarket managers, supermarket checkout clerks and advertising by the store itself all add their costs to the item before it reaches the consumer.

In the service economy, distribution logistics rather than production costs determine how much information expense is tagged on to the final price of a product.

The full cost of the office work contained in any consumer product cannot be discerned just by examining employment data or by studying

”

It is possible to cut services by eliminating information workers, thereby increasing short-term profits. It is equally possible to add new services by adding information workers and thus decreasing short-term profits.

the occupational profiles of a particular industry. It is very simple to shift office work from one middleman in the distributive chain to another. To arrive at the total cost of office work contained in a product's price, one must trace the product from initial production to final consumption. The total cost of information then involves tallying up a chain of information-handling transactions.

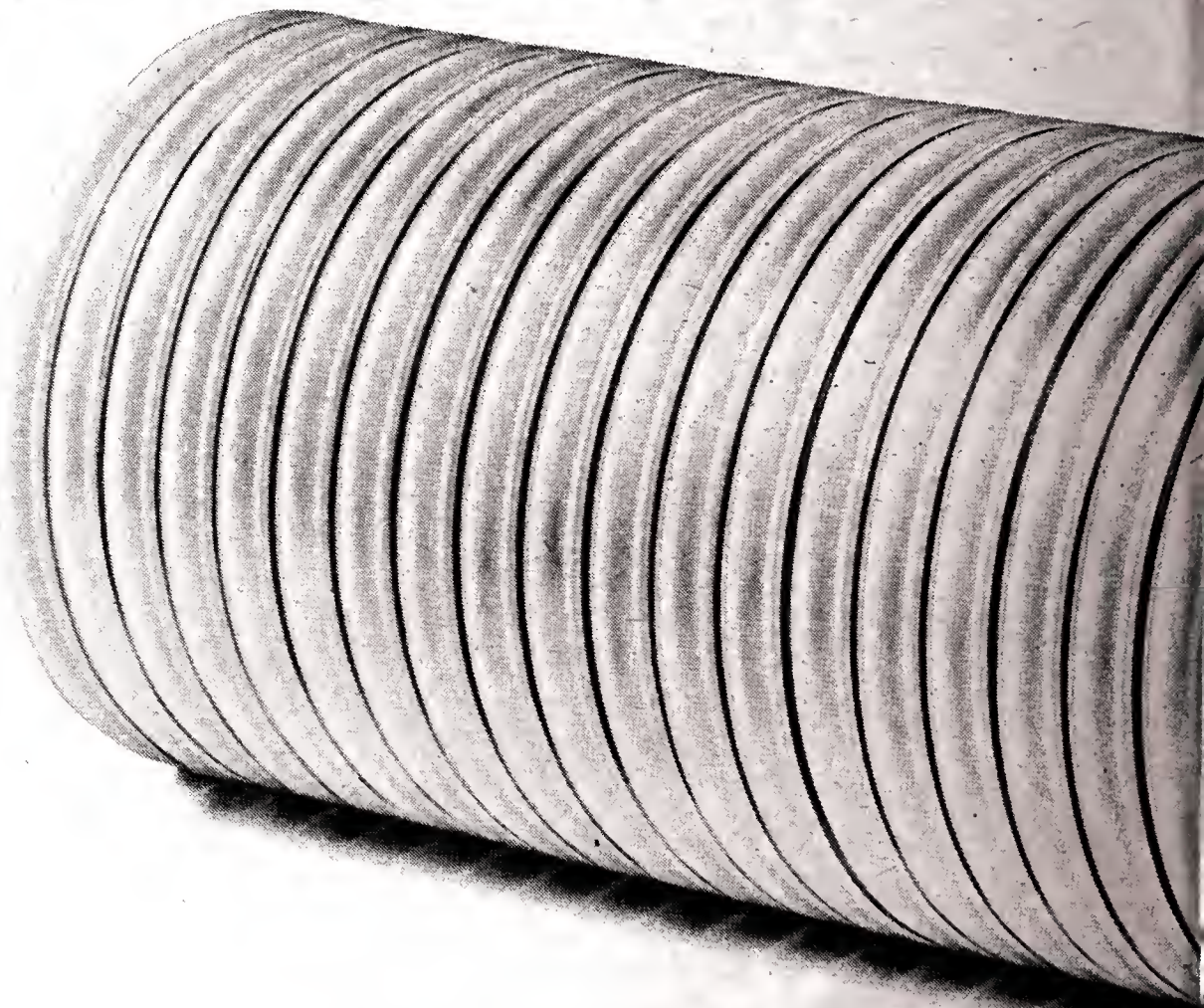
Whether there are too many or too few information workers in the chain is more a function of the effectiveness with which the entire chain is organized than of how efficient the workers are at any one place in the sequence. If the channels of distribution are changed, even firms with high internal efficiency may be bypassed.

Only if real prices are reduced through simplification of the entire

distribution chain does one have an indication that information workers are deployed effectively. With easy transmission of information about customer needs from the retail level directly to the place where the goods originate, the general tendency of information technology will be to diminish the number of intermediaries in the distribution process.

One of the most frequently mentioned ideas about the promise of information technology is that organizational layers within a single company could be substantially reduced. I think that greater attention should be given to the prospect of eliminating costly intermediaries in the delivery of products for an entire market. Ultimately, information technology permits a rearrangement of how goods are distributed on a global scale. Unless a link in the

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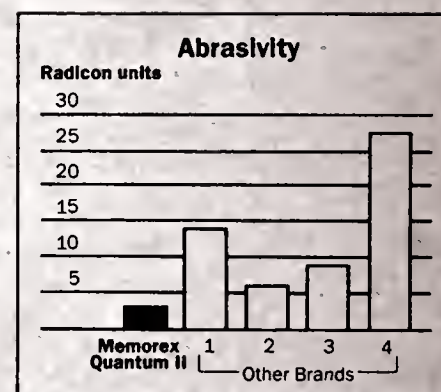
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chain of trades and services adds significant value, information technology will make it possible to bypass it altogether.

Information technology simplifies not only how a single organization operates internally. It makes possible the reorganization of an entire industry to deliver improved value to customers.

The full effects of information technology cannot be evaluated just by observing what happens within the confines of a single enterprise.

It is possible to cut services by eliminating information workers, thereby increasing short-term profits. It is equally possible to add new services by adding information workers and thus decreasing short-term profits. Which option is the

right one cannot be answered except by examining the effects that either move will have on the value of the product as seen by the customers.

To understand the shifts in employment patterns it is necessary not only to track occupational data but also to explore the changing structure of the channels of distribution. The exorbitant cost of replacement parts in the construction industry is largely a reflection of an ineffective distribution system. The steady decline in the real costs of electronic components is largely achieved by designing high-quality, standardized products so that they may be distributed through streamlined, global channels.

Information technology investments should be increasingly directed to areas where they can influence the way in which products are mar-

keted. This is why the most far-reaching effects of information technology on the future structure of the economy will depend on how that technology is used in distribution.

The use of information technology in production will be shaped by the needs of the marketplace for products that can be configured, priced and selected through electronic shopping channels. We are moving from a supply-driven economy to a demand-driven economy. The design of information systems will have to conform to this reorientation.

The information worker in the large, supply-oriented organization will be a specialist.

In the future, all products will contain a large share of information value added in their price. High in-

formation contents will be included either directly — as in semiconductor components or prepackaged training — or indirectly through information costs incorporated in the cost of the item, as with advertising and research.

All standard products will tend to become competitively priced global commodities. Where there are large opportunities for standardization and streamlined distribution, as in the case of consumer electronics, appliances, pharmaceuticals, automobiles, office equipment and entertainment products, strong forces will favor global consolidation, specialization and concentration of production in a few enterprises. Information employment in the large central organizations will be quite small, prices will decline, and management productivity will increase as essential conditions for sustaining international competitiveness.

The information worker in the small, demand-oriented, specialized organization will be a generalist.

In the case of products or services requiring a great deal of customizing or expertise, such as medical services, government services and education, a strong bias will favor small organizations able to deliver to the customer directly a high proportion of the total value added. To survive, these small organizations will have to maintain easy access to the large supply sources without incurring the costs of passing through too many intermediate layers.

For nonstandard products and services, the largest contribution to the value added will always be closer to the consumer's end of the product pipeline. The closer one gets to the ultimate consumer, the greater the advantages will be for smaller enterprises.

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needs of generalists rather than specialists.

Information technology will be the principal influence on the way service organizations operate. In the case of the small, generalist-based service organizations, information technology will become the means for defining the market segments that such organizations can serve profitably. Internally, information technology will become the means for deploying individuals in their new role as generalists — people who can integrate a variety of products and services so as to add value in meeting a customer's unique needs.

The role of information technology, then, will be critical externally in setting marketing strategy and internally in defining organizational design. The chief executive will find

a new role as the firm's chief information strategist.

The whole question of how to improve productivity resolves itself into two issues:

■ Can the information sector reduce its charges to the production sector by investing in capital that will increase its own productivity?

■ Can the production sector reduce its operating costs through superior management aided by information technology?

Jonscher's analysis gives us an indication of what the answers may be. The first step is to examine the growth rates for each sector for the period from 1947 through 1972. The key growth figure, which relates to the issue of capital investment vs. output, is the 433% increase in shipments from the production sector to the information sector. The net cost gain of the information sector was 370%, while its costs to the production sector were up by 383%.

When compared with a mere 259% increase in purchases by consumers, these extraordinary increases in expenditures by the information sector should be viewed with alarm. The faster growth in the costs of the information sector relative to the production sector means that the former suffered a steep decline in its productivity, despite these large infusions of capital.

The figures on productivity in the production sector are more encouraging. Production sector costs increased only by 213%, while direct sales to consumers went up by 259%. This increase is an indication that the production sector was gaining in relative productivity. Whatever its gains, however, they were canceled by the large increases in costs transferred to it by the information sector.

Business strategy should dictate the choice of information technology. Organizational structure will follow.

Until recently, information system design issues did not require the attention of top management. Management had always been able to assume that a production process determined the configuration of information management tasks. Information jobs were not subject to much change: They were the by-product of simple relationships with operating personnel and with customers. Only flows that concerned products or services warranted any sort of formal design.

Some workers were aided by machines and some were not. Who got such equipment was easily determined by economic analysis on a case-by-case basis.

The economic performance of the enterprise was determined by three factors:

■ The kind of business to be conducted.

■ The original design of the product flows.

■ The availability of people able and willing to carry out assigned tasks rapidly and reliably.

If information questions figured at all in this design, they related to questions of control, auditing and managerial prerogatives. The command structure remained simple. Efficiency was achieved through disciplined execution of operating functions. Information about the firm's environment, customers, suppliers or competitors was gathered



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IN DEPTH/INFORMATION PAYOFF

by the marketing and purchasing divisions — and then left to be evaluated by central management, which alone interpreted what information was provided.

In this way, management reinforced its role as the source of all important decisions.

Information technology requires that organizations be deliberately designed rather than allowed to evolve spontaneously.

Computer networks are well suited to moderating conflict by means of instantaneous evaluations of complicated alternatives. For instance, an organization may experience contention between channels of distribution attempting to accomplish the identical marketing mission. Rather than install rigid rules that cannot adequately discriminate among unique cases, all parties can simultaneously view the short as well as long-term

consequences of proposed alternatives.

To design job relationships that do not discriminate between management and operating tasks, information technology should be available to everyone. There will have to be an easy relationship between man and machine, so that choices about the characteristics of each personal machine can be made by the individuals concerned from modules that can be arranged to suit their

needs.

If this is the case, individuals performing both management and operations tasks can deal with a diversity of customers by mixing and matching what is needed for their own personal workstations from a supply of readily available software. Such workers do not require a high degree of technical expertise to make the necessary choices. They are able to assemble and try out a variety of software from a

central library of standard procedures representing the accumulated knowledge capital of entire organizations.

The modules representing central know-how, shared data bases and shared techniques fit together only if there is a common architecture allowing people, machines and standard software to work together without large added costs for integration. Even though the term "information architecture" is ordinarily applied in an exclusively technical sense to describe how terminals and computers transmit messages back and forth, I am using this term in a much broader sense. From the standpoint of organizational design, information architecture is really the plan an organization chooses to give its members access to data, to enlarge the scope of an individual's responsibilities by means of acquired software and to determine who can access another's electronic files and under what terms.

The plan also provides guidance on how to insert safeguards against erroneous electronic transactions, how to ensure a consistently high quality of work without electronic surveillance, how to test systems modifications without damaging the network and how to stimulate the exercise of personal initiative in an environment that is abstract and machine-like.

Positive surveillance

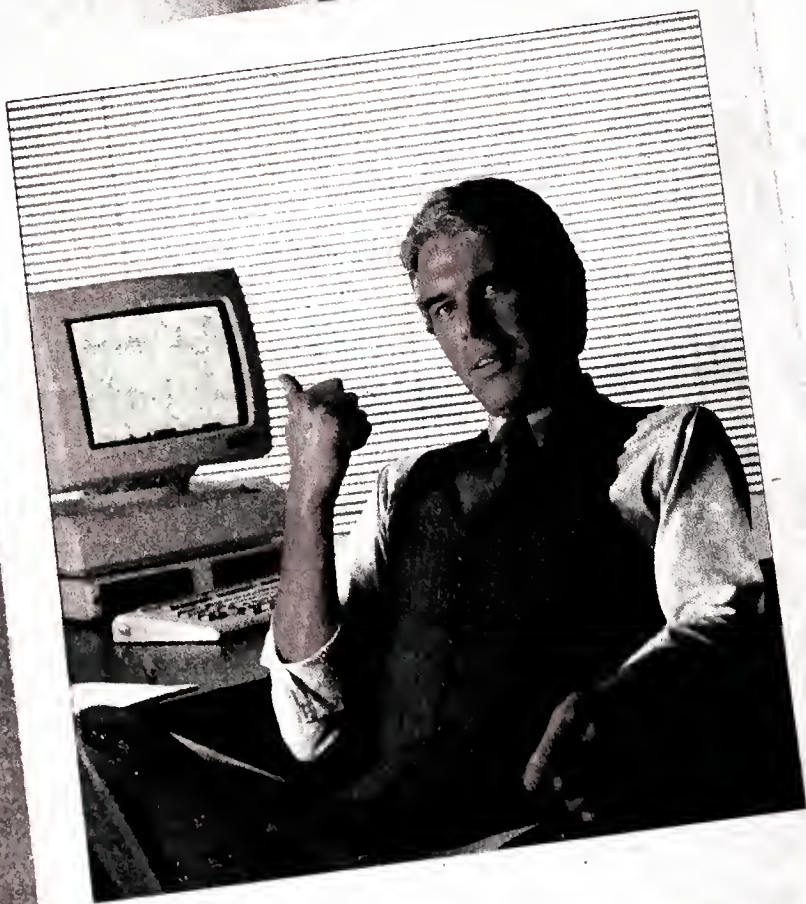
Information architecture in this sense also involves the design of a system that can monitor an individual's work electronically to create personal incentives or attribute productivity gains. Whereas electronic surveillance can be viewed as a repugnant and undesirable feature of electronic networks, we should also recognize that a computer is ideally suited for a person to keep score of his own accomplishments (or errors) so that he can channel his efforts in the most constructive directions. Architecture, then, includes rules about appropriate behavior in an electronic environment.

A deliberate system design pays due regard to how people and machines interact. For instance, it defines what patterns of behavior should be cultivated so that computer workstations are not viewed as omnipresent time-motion study engineers — or perhaps even as policemen. It specifies how electronic communications with customers should be organized so that an individual aided by a workstation can act autonomously and make legally binding agreements.

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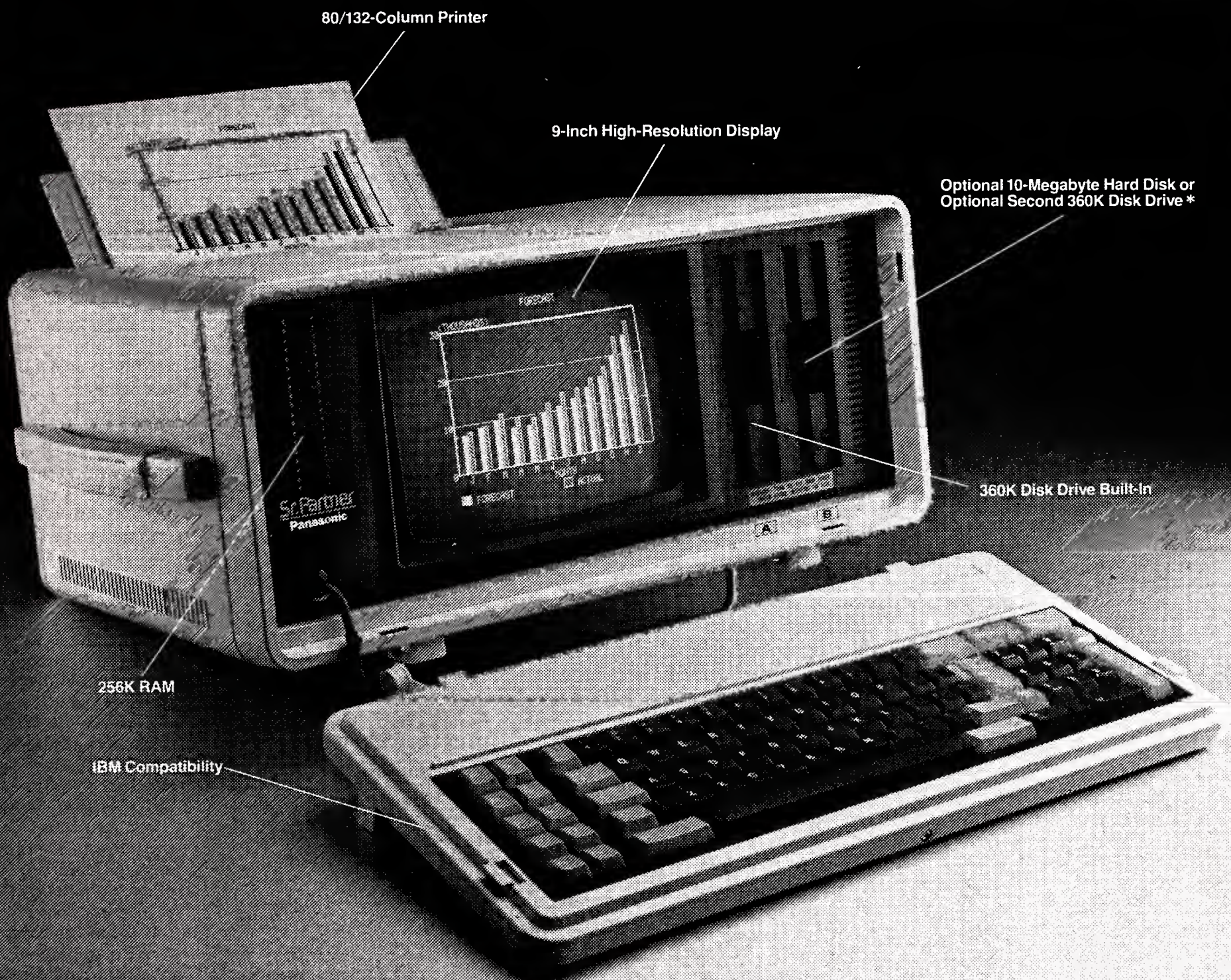
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Organizational design must recognize that information technology will totally transform traditional roles. Executives will be upgraded from investors to planners. Managers will be upgraded from coordinators to investors.

all customer requests. Competitive advantage in the service sector will then depend on its personnel's superior information-handling capabilities in satisfying customer needs. To this end, system design must focus on helping people to apply their fullest skills rather than on optimizing the computer system's own technical performance.

Such design stimulates the personal initiatives of its operators by means of rapid

feedback. For example, this kind of system provides rapid (less than one second) access not only to local data bases but simultaneously to remote computers and multiple telephone contacts as well. The design informs the operator whether he is delivering an improved service to the customer. An indication as to payoffs is included along with every customer transaction.

Future organizations will

need more, not fewer, managers.

Information technology is supposed to dispense with much of the need for middle management. Mechanization of engineering work is supposed to decrease the number of engineers needed. Prognosis after prognosis reiterates the simple formula: If a computer can do what X does, then X will not be needed any more.

Such simplification is based on a static view of business and on limited perceptions about the roles of people in the economic environment of the future. I am convinced that with growing use of robotics in factories, the fraction of information workers will increase from the present 56% to more than 70% by the year 2000. The U.S. work force can also be expected to grow to more than 140 million by that date. Simple arithmetic shows that at least some information worker occupations will have to expand enormously.

Current trends do not support forecasts that the numbers of managers will diminish. On the contrary, all detailed observations suggest that management positions increase with office automation. What adds to the confusion is that as old management jobs are eliminated, the dynamics of the process that creates new management jobs are not as well understood.

Changing work roles

Information technology will ultimately result in a complete overhaul of present management roles. Along the way it will create a large array of vastly more productive jobs. In this process of creative destruction, the weak link is the middle manager, about whose fate everyone is so worried. Indeed, concern about the continued viability of the manager as a coordinator of specialists is justified.

More than two-thirds of the contemporary manager's time is expended in passing intraorganizational information to others. We know that most of these tasks can be performed much better through computer networks. The role of the manager as a coordinator and as an information intermediary will largely disappear — in its place we will see the manager assuming an important role as an investor.

With the advent of the information middleman, enormous operational efficiencies in the handling of information work will be realized. However, rising costs of labor will make it necessary to devote an increasing share of a firm's revenue to investments in the future, rather than just to cover current expenses.



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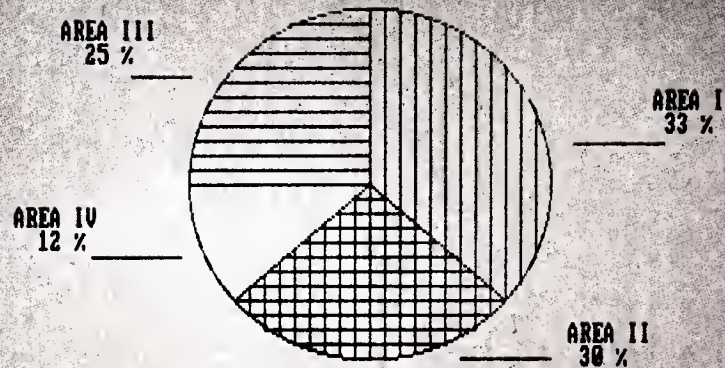


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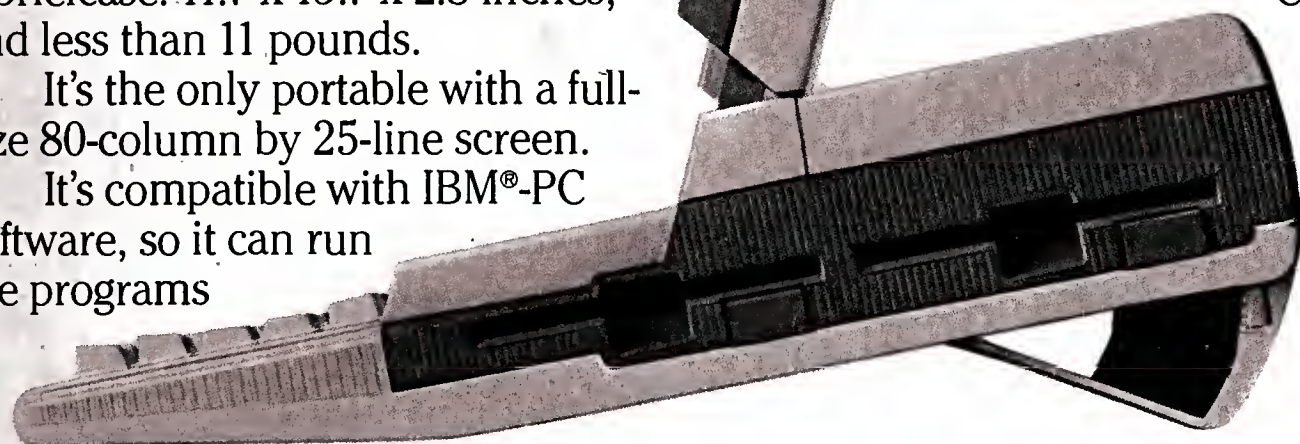
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This capital expenditure will not apply to information technology alone; it will apply even more to investment in human capital. A great deal of management time is needed to provide proper guidance for activities such as training for quality, growth and work enlargement, building up an individual's experience on the job and reducing employee turnover through leadership-inspired motivation.

None of this can be done

by means of a computer program. The manager of the future will have more work to do than anyone dreams of today. The ranks of management will expand, not shrink, although the manager of the future will have to possess distinctly different skills from those presently required.

The manager of the future, in his role of investor, will take over many of the responsibilities presently cloistered in the executive

suite. As long as investment decisions were essentially of a financial nature, it was possible to restrict them to top executives. Managing investments made in people can be done only where those people are. With most of the investment decisions out of the hands of top executives, they will finally have time for their truly essential role: to be the planners, strategists and creators of a unifying vision of the enterprise and articulators of a

shared language that binds the parts into an integrated whole.

The top executive can then concentrate on his role as innovator and entrepreneur. With a large increase in the number of small to medium-size enterprises in the future, I anticipate an expansion in the demand for people who can fill executive and management jobs. The fraction of the total work force in executive and managerial jobs can be expected to

increase from the present 11% to perhaps as much as 17% of a work force larger by some 40% just 20 to 30 years from now.

The greatest changes in work patterns will be found among professional and technical personnel; they presently account for 16% of the total work force and can be expected to rise to 24% in the next two to three decades. They will be the largest occupational group, delivering most of the information services that our high-tech society will require in such large quantities.

The rise in average compensation levels for this group will lead the average increase of per capita income for the entire society. In contrast to current fears that a high-tech society may become a two-tier society, the professional and technical group will create the conditions for a large concentration of highly paid wage earners at the middle of the income distribution curves.

Professional and technical people will change their current roles as specialists, controlled in every respect by their coordinators/managers, to become generalists who include many traditional managerial functions in their everyday work. They will provide full service to customers, rather than just working on small fragments of it. They will be the equivalents of the factory of the past — except that now they will be delivering both producer and consumer services, rather than producer or consumer services.

Their jobs will expand in complexity. Due to the fast pace of technological change, their know-how will be subject to rapid obsolescence. Consequently, this group will become large consumers of training and education. A significant portion of their time, perhaps as much as one-fourth, will be devoted to improving their work skills.

Designing organizations of the future cannot proceed on the assumption that this change merely involves rearrangement of existing occupations and skills. Organizational design must recognize that information technology will totally transform traditional roles. Executives will be upgraded from investors to planners. Managers will be upgraded from coordinators to investors. Professional and technical personnel will be upgraded from specialists to generalists engaged in organizing the delivery of services to customers. Clerical personnel will be upgraded from support staff members to specialists in the delivery of information services. Sales personnel will be upgraded from distributors of information to general managers of customer care and

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retention. Only such upgrading can create organizations that will deliver increased value for everyone — lower prices for customers and higher income for the work force.

The history of information technology can be characterized as the overestimation of what can be accomplished immediately and the underestimation of long-term consequences.

The attitudes of information technology managers are a curious mix of overoptimistic faith in the power of the latest technology, blended with a totally conventional view of what the ultimate results will be. I call this peculiar syndrome "technological macromyopia." The costs of the next technology project will always be underestimated. The implementation

lead time for the latest product will always be much longer than expected.

The choice of technology may be almost the last matter to be decided. This critical point can be illustrated by the following case. A few years ago, a government agency built a model computer system to solve its severe administrative problems. As time passed, the people operating the system became mere appendages of the computer, because all available investments were absorbed by the drive to achieve maximum automation of even the most trivial clerical tasks.

The technology's design dictated that operations personnel should perform increasingly narrow and mindless tasks. The cumulative investment in the software and computer equipment was compounded

over a long period of time. When external changes imposed new demands, they could be dealt with only by squeezing new requirements into old procedures.

After a few years, obsolescent technology and rigid organization finally caught up with the system. Employee dissatisfaction rose. Failure and error rates reached scandalous levels.

At this point, both the system and the people operating it lost all adaptability to evolutionary change because their energies were fully taxed just keeping the indispensable system from falling apart. Consultants recommended that a brand-new system be built at another site to replace the existing technology as well as the existing organization. Those running the current system had to be motivated, however, until the new

replacements were ready.

The cost of creating a duplicate environment was enormous — and the human costs associated with job displacement were astronomical. Needless to say, the entire project collapsed when those operating the old system found it easy to make the new system fail. The government agency in question has not yet recovered from the ravages of this experience.

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The choice of technology may be almost the last matter to be decided.

ered from the ravages of this experience.

The lesson to be drawn from this story is simple: Do not let technological priorities get ahead of organizational consequences. In any information system, the value of the people operating it will always be worth much more than the accumulated hardware and software — unless a deliberate decision is made to reduce the people to mere appendages of the computer.

If most maintenance expenses are allocated to the advancement of technology rather than to the development of people, someday the penalty will have to be paid. Obsolescence is a term applicable not only to technology. People and organizations also age. A computer system never becomes obsolete because electronic circuits cease to work but because people cannot use it effectively anymore.

Sometimes this is due to changes in the external environment. In my experience, it happens primarily from internal causes. When external failure is finally analyzed, it comes as a revelation that the system had been rotting from within for a long time.

Rigidly organized applications, administered by organizations that do not develop their personnel to meet new challenges, add up to a sure prescription for disaster.

Managers who want to learn more about making investments in computer technology usually sign up for studies in computer literacy. This endeavor may enhance their general education, but it will waste their time in other respects. The proper way to learn how to manage computers is not to study technology per se. It is more important to learn how information technology can be shaped to meet the needs of organizations.

The sequence, evolution and application of information technology must be secondary to the pursuit of managerial objectives. Knowing something about bits and bytes is not a bad idea — unless it leaves the manager with a case of technological macromyopia. The role of good managers is to integrate diverse demands for internal resources so that the entire organization succeeds in using information technology to improve its competitive position. Always subordinate technology to business strategy.

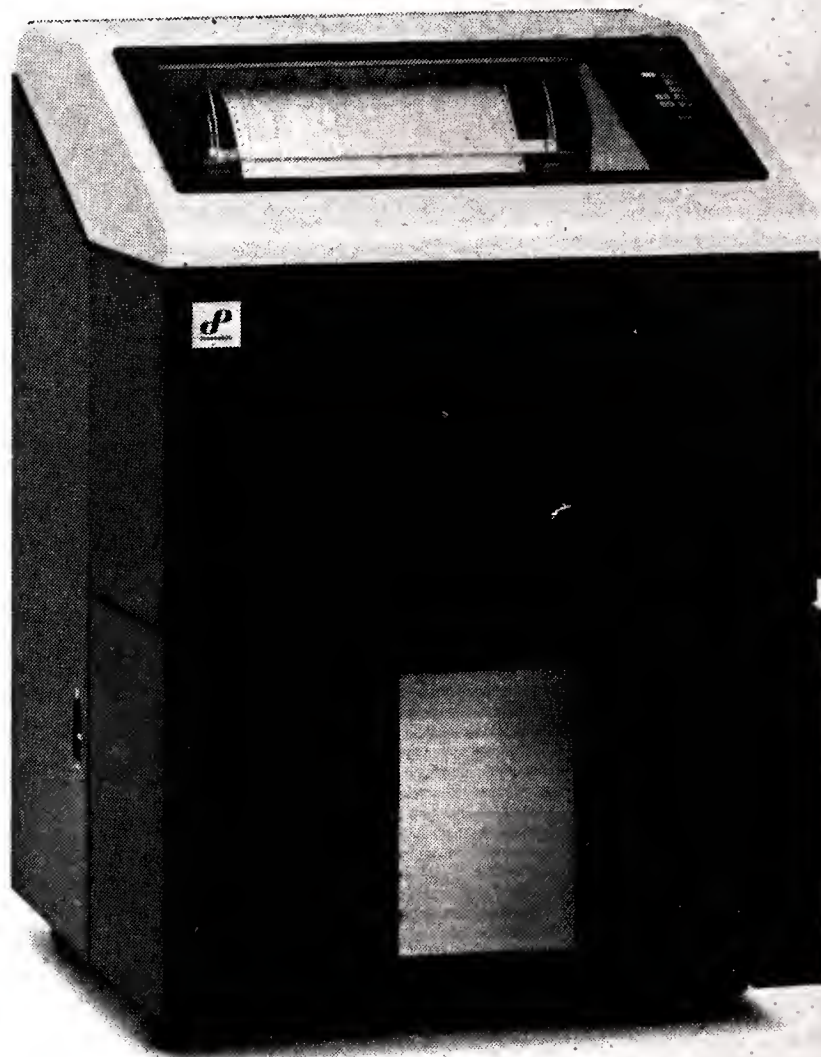
About the author

Paul A. Strassmann is vice-president of the Information Products Group at Xerox Corp.

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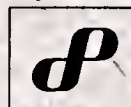
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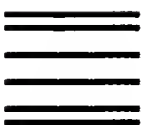
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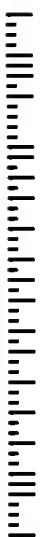
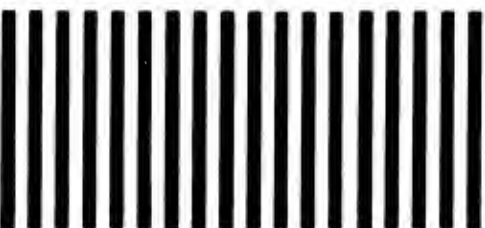
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DATA STREAM

John Dix
CW Senior Editor

Appletalk sets micro net trend

Unconventional by today's standards, Apple Computer, Inc.'s recently announced Appletalk local-area network portends a new trend in local networking where all that must be done to connect nodes to the network is add a small device that puts the signal on the cable and add communications software that runs on embedded silicon.

The simplicity of this approach — as compared with the normal requirement to dissect computers and add a special interface board — is particularly appealing when networking microcomputers.

Personal computer networks are important in the broader scope of things because, from today's perspective, it seems that most users will initially employ local networks to support personal computer clusters rather than opting for a buildingwide net. When needed, these network islands can be tied into a corporate network through a gateway or a private branch exchange or strung together with a high-capacity premiseswide backbone network.

Simplicity of use is probably more important to personal computer network acceptance than cost, although Apple has also crushed that barrier. It overcame both hurdles by embedding three communications chips in its Macintosh personal computer: a programmable Zilog, Inc. 8530 serial communications controller, an RS-422 driver and an RS-422 receiver.

The only hardware needed to interconnect Macintoshes with Appletalk is a \$50 transceiver and a cable that contains a single pair of shielded, twisted-pair, telephone-type wires. The transceiver connects to the Macintosh's printer port and has two female connectors, one each for adjoining Macintoshes. Appletalk is self-terminating so that the last processor in such a daisy chain does not need a special terminating device.

Up to 32 Macintoshes can be supported in a single cluster that doesn't exceed 1,000 feet. Each processor vies for access to the network, which operates at 230.4K bit/sec using a Carrier Sense Multiple Access with Collision Avoidance access method. Data is packetized to be shuttled across the network by software. It is this software, in combination with the embedded silicon, that enables the network connection to be so inexpensive.

Besides the Macintoshes, other devices meant to be supported by Appletalk are also intelligent, including a concurrently released laser printer called Laserwriter and a file server under development. The roughly \$7,000 Laserwriter, for example, is based on Motorola Inc.'s 68000 microprocessor and contains 1.5M bytes of random-access memory and 0.5M bytes of read-only memory. By bundling intelligence into attached devices, instead of the network, a higher level language can be used for communications.

See APPLE page 86

RCS-100 switch enhanced

Atlantic Research's X.25 net system, recorder, CRT system join switch's new criteria

Atlantic Research Corp. has announced an enhancement for its RCS-100 Remote Control Switch and three products, the Xpert Packet Terminal System, the CRT Controlled Remote Fallback Switch System and the Interview 20R Data Recorder.

The company announced an automatic switching criteria for the RCS-100, which is said to provide automatic restoration of failed circuits without operator intervention.

The RCS-100 performs remote cross-over, spare and group switching of two-, four-, six- and nine-wire analog circuits and two-channel and two-wire coaxial circuits, according to the vendor. It can reportedly be controlled by a touch-type telephone, a CRT terminal or locally.

The RCS-100 is modular, costing \$3,500 for every 16 circuits.

The Xpert is said to be the first terminal designed for X.25 networks, allowing interaction with up to four different host computers at the same time. It was designed to emulate IBM 3270, Digital Equip-

ment Corp. VT100, graphics and Ascii devices. It reportedly allows the user to switch back and forth between data sources with a minimum of keystrokes and requires no protocol converters or packet assembler/disassembler.

Xpert costs \$2,995.

The CRT Controlled Remote Fallback Switch is said to provide local and remote control of existing Atlantic Research Data/Patch patch-switch and switch systems. The switch reportedly displays a system map and circuit status and provides a starter approach for service restoral at unattended sites. It costs \$2,000 for an entry-level system and \$8,000 for 100 circuits.

The Interview 20R Data Recorder is designed to minimize service calls when it is left at a remote site and accessed through a dial-up modem. It captures data and sends it back to a central site for analysis. It costs \$3,950, plus \$500 for the unattended remote option.

Atlantic Research is located at 5390 Cherokee Ave., Alexandria, Va. 22314.

Paradyne Corp. has announced its HDX 12000, a 12K bit/sec switched-network modem for half-duplex, point-to-point applications and the FDX 2400 2.4 bit/sec full-duplex modem/82

Racal-Milgo, Inc. has announced Localink, which is said to allow data to be transferred over standard intrafacility telephone lines without disturbing simultaneous voice communications/82

Interlan, Inc. has introduced an integrated network terminal server for use with Digital Equipment Corp. VAX-11 superminicomputers running DEC's VMS/86

Bridge Communications adds server to give session-level Ethernet records

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. has announced a network management server that provides complete records of session-level activities for Ethernet local-area networks.

The NCS 150 Network Control Server, which will be available March 1, is priced at \$5,900 and provides audit trails on-line or in hard copy for devices attached to local networks. A connection record is generated when a terminal session is first established, recording the time of the connection; the two units involved such as terminal to host, terminal to terminal or terminal to gateway; time of disconnection; the status of the disconnect; and the number of bytes or packets transmitted during the session.

The NCS 150 will also set off an alarm at the time of system overload, contention

backup or if printer thresholds are exceeded. Typical transmission speeds through the NCS 150 are 9.6K bit/sec and 1.54M bit/sec, said William Carrico, Bridge Communications president.

The NCS 150 incorporates all the features of the NCS 100 server, which loads operating system software, configuration files, resource names and utility programs from its 1M-byte disk drive. The NCS 150 and NCS 100 can support up to four communications servers, each of which can support up to 32 terminals or a total of 120 plus terminals.

The NCS 150 is compatible with servers supporting the Ethernet standard (802.3) at the physical and data link layer.

Bridge Communications is located at 1345 Shorebird Way, Mountain View, Calif. 94043.

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USC business school plans telecom center

LOS ANGELES — The business school at the University of Southern California (USC) has announced its Center for Telecommunications Management.

The school plans to offer an executive graduate degree program in telecommunications management with a business school orientation beginning in the next school year. The program will focus on case studies, seminars, guest lectures, travel and topics such as technical issues, regulation and deregulation, competition, markets and customers.

According to Center Director Jagdish Sheth, the center will conduct numerous telecommunications-related seminars and workshops and an annual international conference and will produce several publications and newsletters.

The Center for Telecommunications Management is located at the USC School of Business Administration, Los Angeles, Calif. 90089.

Case Rixon introduces Beeline system in U.S.

Case Rixon Communications, Inc. has announced that its Beeline Electronic Mail Exchange, introduced in the UK 18 months ago, is now available in the U.S.

Based on Motorola, Inc. 68000 microprocessors, the Beeline system uses a Case DCX Data Concentrating Exchange as a front end and is said to provide private mailbox and electronic mail facilities for existing terminal devices.

The system can be accessed locally or remotely using dial-up or dedicated lines. Mailboxes can be accessed from virtually any type of terminal device, including personal computers and word processors, telex/TWX lines or packet-switched circuits.

Prices range from \$50,000 to \$100,000, depending on the number of users and features desired. Beeline supports up to 1,024 ports.

Case Rixon Communications is located at 2120 Industrial Pkwy., Silver Spring, Md. 20904.

COMMUNICATIONS

CONTROLLERS

■ Morning Star Technologies has introduced its Horizon series, a board-level communications processor that can support two new communications packages.

The communications processor, Model 200 Multibus, is an intelligent processor designed for supermicrocomputers that utilize IEEE 796 Multibus standard structure, the vendor said.

The processor reportedly features a Motorola, Inc. 68000 microprocessor; 128K bytes of random-access memory (RAM), which can be expanded to 512K bytes of RAM; two synchronous data communications lines; and a direct memory access interface to the bus, Morning Star Technologies said.

One communications package, MST/Hasp, provides full-featured file transfer capabilities, and the MST/X.25 features packet-switching protocol support. The Multibus processor sells for \$2,500, the MST/Hasp software is priced at \$2,400, and the MST/X.25 package costs \$3,000, according to the vendor.

Morning Star Technologies, Suite 204, 4510 Kenny Road, Columbus, Ohio 43220.

VOICE/DATA COMMUNICATIONS

■ Racal-Milgo, Inc. has announced Localink, which is said to allow data to be transferred over standard intrafacility telephone lines without disturbing simultaneous

voice communications.

Localink allows a company to install a terminal using existing telephone wire as its line, the vendor said. The product reportedly features protocol transparency, full-duplex capabilities, transmission distances of up to four miles and transmission speeds up to 14.4K bit/sec.

Localink reportedly is designed for use in point-to-point communications or in conjunction with Planet, Racal-Milgo's private local-area network system. Localink costs \$500.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

PROTOCOL CONVERTERS

■ Diversified Data Resources, Inc.

has announced a 32-port version of its Hydra II, a direct channel-attach protocol converter and controller that works with IBM mainframes.

The product attaches to the byte channel of IBM hosts and provides IBM 3278 and 3279 terminal emulation for microcomputers and Ascii terminals, the vendor said. Ascii printers that emulate IBM 3286, 3287, 1403 and 3211 printers are reportedly also supported.

The 32-port version of Hydra II, available in rack-mounted or stand-alone models, sells for \$13,900.

Diversified Data Resources, Suite 7, 25 Mitchell Blvd., San Rafael, Calif. 94903.

MULTIPLEXERS/MODEMS

■ Paradyne Corp. has announced its HDX 12000, a 12K bit/sec switched-network modem for half-duplex, point-to-point applications; and the FDX 2400 2.4 bit/sec full-duplex modem.

The HDX 12000 is said to be an advanced signal-processing modem for synchronous data transmission over the public-switched telephone network. It reportedly includes an automatic fallback to 9.6K bit/sec. It is scheduled for first-quarter 1985 delivery and costs \$3,600. The FDX 2400 is said to be a 2.4 bit/sec full-duplex, autodial modem designed for two-wire public-switched telephone network applications.

The FDX 2400 reportedly automates call connection, information transfer and disconnection for synchronous or asynchronous host-to-terminal and terminal-to-terminal applications. The modem reportedly features dual RS-232C ports for continuous access and use of synchronous and asynchronous terminals for synchronous host-terminal communications and traditional asynchronous communications.

Also scheduled for first-quarter delivery, FDX 2400 costs \$805, Paradyne said.

Paradyne, 8550 Ulmerton Road, Largo, Fla. 33540.

■ Coherent Communications Systems Corp. has introduced its DSM-32 Digital Speech Plus Data Multiplexer for use with 56K or 64K bit/sec wideband digital circuits.

The DSM-32 reportedly provides simultaneous transmission of one 32K bit/sec digitized voice channel and up to three high-speed data channels. It uses the vendor's Adaptive Pulse Code Modulation (APCM) to digitize the voice signal at 32K bit/sec.

It also reportedly can pass analog modem signals at speeds up to 9.6 bit/sec. The company claimed that its APCM technique provides a signal-to-noise ratio comparable to that of 64K bit/sec pulse code modulation. The DSM-32 can be strap-configured with the voice channel and combinations of 19.2K bit/sec and 9.6K bit/sec data channels for 64K bit/sec or 56K bit/sec channels, according to the vendor.

Scheduled to be available during the second quarter of 1985, the DSM-32 is priced at \$2,245, the vendor said.

Coherent Communications Systems, 60 Commerce Drive, Hauppauge, N.Y. 11788.

If you can write a witty one-liner as good as these, you could be a winner in the 1985 Computerworld Button Contest.

Since 1968, as all you real old-timers know, *Computerworld* buttons have been a major hit at trade shows around the country. Recently, more than 100,000 buttons a year have been given out to otherwise normal people.

Many of these buttons have been written by people like yourself — respectable professionals with more than half a wit who have submitted winning entries to the incredible *Computerworld* button contest!

Now you have but another chance to participate in this madness.

Here's how it works: You take the entry blank below (or a copy thereof) and put down your two best ideas (two's the limit because we get tired easily). They should be short, funny, relevant and at least moderately clean.

Send in your entry to the address below. After the deadline a panel of judges will be conscripted and thrown into a windowless room with a case of beer and instructions not to come out until they have picked six winning lines. If your slogan is among them, you will receive a certificate of appreciation (suitable for framing, of course).

In addition, all the people who submitted winning entries will be thrown into a hat (at least their names will be) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky people (or animals, as the case may be) will receive a \$75 gift certificate good at a selected computer store (probably the one that'll give us the biggest discount).

Remember that all entries become the property of CW Communications/Inc., and that the decision of the judges will be considered final. No representations as to the competence, skill or fairness of the judges are being made. All entries must be received at our offices in Framingham, MA, no later than March 1, 1985.

My micro
doesn't give
a sheet
COMPUTERWORLD

IS
MS DOS
a feminist?
COMPUTERWORLD

I love it
when you
talk
Cobol
COMPUTERWORLD

The
Shadow
Nodes
COMPUTERWORLD

My
intelligence
is
artificial
COMPUTERWORLD

Don't
squeeze the
software
COMPUTERWORLD

Yes,

I'd like to enter Computerworld's ridiculous button contest. I hope your judges can see. Here is my entry. (If you have more than one, please put them on separate forms).

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Write your entry here:

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

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Send to: Nancy Langmeyer, Marketing Services Department,
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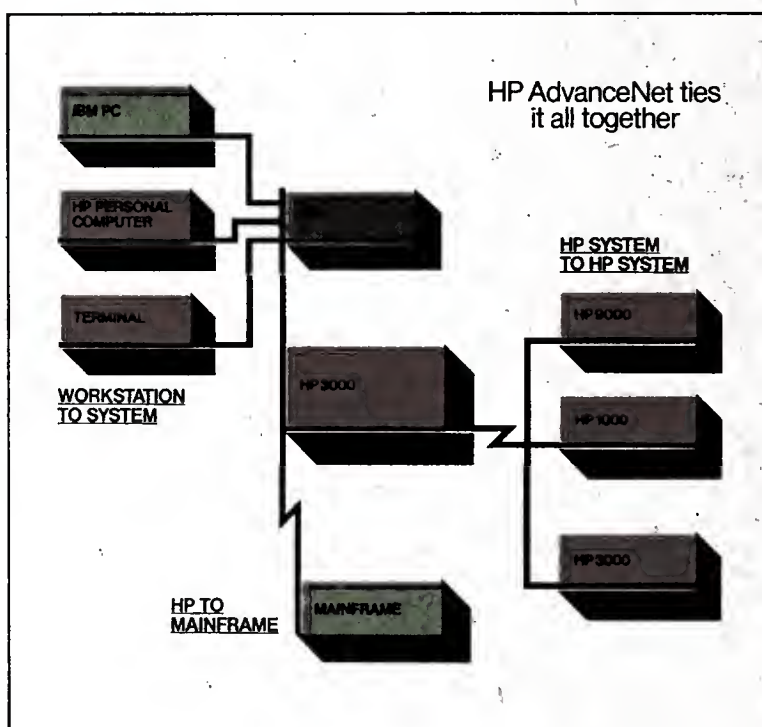
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**HEWLETT
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COMMUNICATIONS

LOCAL-AREA NETWORKS

■ **Interlan, Inc.** has introduced an integrated network terminal server for use with Digital Equipment Corp. VAX-11 superminicomputers running DEC's VMS.

The INTS/VMS is said to provide 32 direct links to a VAX/VMS system on an Ethernet local-area network. It is a hardware and software package that uses a single DEC Unibus slot and, according to the vendor, replaces four asynchronous controllers and eliminates the need for separate outboard Ethernet terminal servers.

The product reportedly includes Interlan's NP100 processor board, which off-loads the host from CPU-intensive protocol processing while freeing up three Unibus slots.

It also includes the same set of application-level protocol software found in Interlan's NTS10 terminal server and a set of host-resident software routines, according to the vendor.

The INTS/VMS is priced at \$6,190, the vendor said.

Interlan, 155 Swanson Road, Boxboro, Mass. 01719.

■ **Ungermann-Bass, Inc.** has announced Network Interface Unit Model 180 (NIU-180), a network interface unit that connects eight user devices to Ungermann-Bass' Net/One local network.

The product, based on Intel Corp.'s 80186 microprocessor, expands the number of network management services on Net/One and reduces port connection costs by up to 27%, the

vendor said.

Each of the NIU-180's eight ports can support speeds from 9.6 to 19.2 bit/sec, the vendor said.

The product can be used with broadband and baseband coaxial cable, optical fiber and thin coaxial cable. The broadband model has an integral modem that transmits data at a speed of 5M bit/sec while other versions operate at a speed of 10M bit/sec.

NIU-180 costs \$2,950.

Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

■ **Bridge Communications, Inc.** has announced an enhanced version of its CS/1-HSM Ethernet communications server for Digital Equipment Corp. minicomputers.

The enhancement involves adding DEC DH-11 multiplexer support to its original DEC DMF-32 communications controller support capability, according to Bridge. The DH-11 functionality is said to allow the CS/1-HSM to serve as a single-cable Ethernet local-area network connection mechanism for DEC systems including PDP-11 minicomputers, VAX-11 superminicomputers running AT&T Unix System V and Decsystem-20 series mainframes that do not have DMF-32 support.

The CS/1-HSM host interface system is a front-end processor supporting up to 64 terminal sessions from other nodes on an Ethernet local-area network to a DEC minicomputer over a single, high-speed serial line. It is priced at \$16,500.

Bridge Communications, 1345 Shorebird Way, Mountain View, Calif. 94043.

To get the world's most advanced 50 CPS daisywheel printer, you'll have to pay less.

The TeleVideo® 750 delivers 50 CPS performance using an incredible 40% fewer parts than any comparable printer. So it's no mere coincidence that the 750 sells for up to 40% less. With quality so good, you can produce camera ready copy directly.

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For information about TeleVideo Printer dealers in your area or a free demonstration, call 800-521-4897. In California 800-821-3774.

Regional Sales Offices: Schaumburg, IL (312) 397-5400, Norcross, GA (404) 447-1231, Waltham, MA (617) 890-3282, Syosset, NY (516) 496-4777, Irving, TX (214) 258-6776, Irvine, CA (714) 476-0244, San Jose, CA (408) 971-0255.

TeleVideo
Printers



APPLE from page 81

This language, called Postscript, was jointly developed by Apple and Adobe Systems. It enables a description of a page created on the Macintosh's bit-mapped display to be interpreted in only 4K to 8K bytes of data and transmitted to the Laserwriter where it is printed with a resolution of 300 dot/in.

To require only 6K bytes of memory

Part of the beauty of Appletalk is the powerful network software Apple claims will only require 6K bytes of memory. In fact, it is so efficient that the relatively low-speed, 230.4K bit/sec network can achieve an estimated 80% to 85% throughput, claimed Arnie Lapinig, Apple network product manager.

At Apple's annual meeting last month, where it first disclosed Appletalk, the company also showed a product reportedly under development that will provide a gateway to IBM's Personal Computer Network. Additionally, this hardware/software board-level product will enable Macintoshes to use an IBM Personal Computer AT as a gateway and as a file server. Apple reported that other network devices, including file and disk servers, other gateways and additional software, are being developed by third parties.



"Miss Egan, get me the computer operator who thinks he's running this company!"

SYSTEMS & PERIPHERALS

Intel unveils nodal processing system

By Tom Henkel
CW Staff

BEAVERTON, Ore. — Intel Corp. today unveiled what it claims to be the first commercially available concurrent processing system, the IPSC. The three-model line is based on multiple nodal processors, each of which is capable of performing independent computations.

The three models accommodate 32, 64 and 128 nodes, respectively. The nodes, in turn, form five-, six- and seven-dimensional hypercubes. (A hypercube is an interconnection scheme for linking a collection of microcomputer-based nodes.) A 32-node cube, for example, represents a five-dimensional system, whereby each node is directly attached to its five nearest neighbor nodes. Likewise, a 64-node configuration is a six-dimensional hypercube and a 128-node configuration is a seven-dimensional hypercube, the vendor said.

The architecture for the IPSC family was developed by a team of researchers at the California Institute of Technology and dubbed the Cosmic Cube [CW, Jan. 30].

Each node contains one Intel 80286 CPU, an 80387 numeric processing unit and 512K bytes of random-access memory. Adjacent nodes are linked via 10M bit/sec, point-to-point communications channels, the vendor said.

Designed to use Microsoft Corp.'s Xenix operating system, each IPSC system consists of a Cube and a Cube Manager. The Cube consists of the interconnected nodal processors. The Cube Manager is a Xenix-based Intel 286/310 microcomputer containing 2M bytes of main memory, a 40M-byte Winchester disk drive and a 320K-byte floppy disk drive. The Cube Manager is said to give users support tools for programming, provide system management functions and help with maintenance.

Communications between the Cube and Cube Manager are performed via a global 10M bit/sec channel connected to each node in the system. This channel is used to distribute programs, data and control options, computational results and other functions, according to the vendor. The IPSC

systems also feature an Ethernet TCP/IP network interface option that allows them to access external data bases. The TCP/IP interface also can be used to make the IPSC system available to networked users, according to Intel.

The three models announced today are the 32-node, 16M-byte IPSC/D5; the 64-node, 32M-byte IPSC/D6; and the 128-node, 64M-byte IPSC/D7. The company said the units range in performance from 2.7 to 10 million floating-point operations per second and will be available in June. The units are modular, meaning users can field upgrade to a higher performance model by adding 32-node computational units. System memory capacity and memory are said to double with each upgrade.

Intel initially plans to market the IPSC line to educational institutions.

The IPSC/D5 costs \$150,000, IPSC/D6 costs \$275,000, and IPSC/D7 costs \$520,000.

More information is available from Intel at 15201 N.W. Greenbrier Pkwy., Beaverton, Ore. 97006.

■ Gould, Inc. unveiled a low-end addition to its Power series of superminis/88

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Board-Level
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Paradyne adds IBM-emulation terminal line

LARGO, Fla. — Paradyne Corp. announced the PDX Messenger line of terminals said to provide IBM 3270 terminal emulation, IBM networking support and IBM Personal Computer software support.

The six-model PDX Messenger line is said to offer local processing capabilities plus the ability to interface with a host processor via several communications architectures, including IBM's Systems Network Architecture, X.25 and Paradyne's Pixnet. In addition, the PDX Messenger models can also be used to emulate other terminals. Currently available emulation packages include IBM's 3278 Models 2, 3, 4 and 5, as well as IBM's 3279 Models 2B and 3B, the vendor said.

The six models may be upgraded and range from a monochrome unit to a color terminal with support for IBM Personal Computer graphics software. The units use Intel Corp. 80188 microprocessors and include an asynchronous communications port, a floppy-disk port and 192K bytes of random-access memory (RAM) expandable to 640K bytes, the vendor said.

Local storage options provide standalone IBM Personal Computer functions. Local storage can be located beneath the base of the terminals in two half-height 360K-byte dual-sided, dual-density floppy disk drives or a 360K-byte half-height floppy disk drive and one 10M-byte Winchester disk drive. An option is also available to accommodate IBM Personal Computer add-on boards, the vendor said.

A controller provides the interface between a PDX loop and a network. PDX controllers can be upgraded to controller/servers with the addition of a Winchester disk drive offering up to 40M bytes of storage. Server software allows terminals on the PDX loop to have access to applications and information stored on the server

See PARADYNE page 94

PE offers low-end supermini

Desk-side, 16-user 3203 can accommodate up to 4M bytes memory, 170M bytes disk storage

OCEANPORT, N.J. — Perkin-Elmer Corp. beefed up the low end of its supermini-computer line with the 3203.

Capable of supporting up to 16 users, the desk-side 3203 can support from 512K to 4M bytes of main memory and up to 170M bytes of disk storage. PE plans to market the system to large-volume end users as well as to OEMs and value-added resellers.

Available in March, the 3203 uses PE's OS/32 operating system. The unit is also said to support most of the company's existing software. According to the vendor, the basic 3203 system configuration includes the 32-bit CPU, 512K bytes of main

memory, communications and peripheral controllers, a 51M-byte, 5¼-in. Winchester disk drive, eight communications ports, a ¼-in. streaming 60M-byte tape drive and a printer port. It costs \$16,600.

The same configuration with 85M bytes of disk storage costs \$17,990. The basic system configuration with 1M byte of main memory costs \$18,990 (\$20,990 with 85M bytes of disk storage).

A 2M-byte configuration costs \$23,890 (\$25,890 with 85M bytes of disk storage). The 4M-byte model costs \$31,990 (\$33,990 with 85M bytes of disk storage).

PE is located at 2 Crescent Place, Oceanport, N.J. 07757.

Datapoint adds storage systems, OA upgrades

SAN ANTONIO — Datapoint Corp. has introduced two entry-level storage systems, the 9334 and 9339, which are supported under Datapoint's proprietary operating systems. The company also announced office automation enhancements and some communications and information access abilities.

The 9334 storage system consists of a 28M-byte Winchester fixed-disk drive with a bit-transfer rate of 5M byte/sec and a 65M-byte removable streaming cartridge tape drive. A 28M-byte disk drive can be transferred to a single tape unit in approximately 10 minutes, the vendor said.

The 9339 system is a tape-only system that is said to be a replacement for floppy diskette units.

The price for the 9334 is \$8,500. The 9339 costs \$5,000.

The OA enhancements to Datapoint's Pro-Vista Office Automation software include the following: the Vista-Spell spelling checker module that is priced at \$1,500 for a one-time license fee for each copy on each mass storage device; the Vista-Finder filing and retrieval tool, which costs \$1,000; and a Calculator Emu-

See OA page 94

Graphics subsystem among Cadmus debuts

LOWELL, Mass. — Cadmus Computer Systems, Inc. has announced a graphics subsystem, a graphics software package, list manager software and a development system.

The Q-bus-compatible, monochrome graphics subsystem was designed to run Cadmus' Cadmac graphics software. The subsystem comprises a graphics controller; bit-mapped, noninterlaced, monochrome display; a Digital Equipment Corp. VT100-style, bit-mapped keyboard; and a three-button mouse.

The graphics subsystem will be available in the second quarter of 1985 at a cost of \$5,890.

The company also announced that the Neo-Visuals modeling and animation software from Neo-Visuals, Inc. — designed to create three-dimensional color simulations — is available for the Cadmus 9770 color graphics workstation with a display controller from Raster Technologies, Inc. of Billerica, Mass. Applications include broadcast and production, architectural design and planning, interior design, scientific analysis and simulations, computer-aided design and manufacturing, graphic arts and automotive design.

See CADMUS page 94

SYSTEMS & PERIPHERALS

TERMINALS

■ **Sidereal Corp.** has enhanced its Micronet 25E desktop communications terminal with mechanical modifications that cut its size and weight, reduce time required for repair and increase disk storage capability.

The size of the updated system has been reduced by 90 sq in. to a desktop space requirement of 15.8 by 16 in. The weight has been reduced by 20.5 lb. Mean time to repair is said to have been cut to less than 10 min by increased modularity of cabling and modifications to component layout.

Sidereal has implemented half-height disk technology in the terminal, and archival storage has been doubled to 656K bytes (formatted) using double-sided, double-density disks with a formatted capacity of 164K bytes per side.

Base price for a single Micronet 25E is \$5,995, including the printer.

Sidereal, 9600 S.W. Barnes Road, Portland, Ore. 97225.

PRINTERS/PLOTTERS/
PERIPHERALS

■ **Ithaca Peripherals, Inc.** has announced a two-station printer for point-of-sale system applications. The Model 200 is designed to provide two printers on one chassis and can be used as a combination invoice and receipt printer.

The Model 200 contains an 80-col., 120 char./sec printer that is compatible with Epson America, Inc. and Okidata Corp. machines and a 40-col., two-line/sec thermal printer.

The suggested retail price of the printer is \$995, with an evaluation unit available for \$650, the vendor said.

Ithaca Peripherals, Cornell Industry Research Park, Building One, Brown Road, Ithaca, N.Y. 14850.

■ **Lee Data Corp.** has introduced a color graphics matrix printer for use with its Series 70 Personal Workstation.

The eight-color Model 1310 printer provides images of personal computer graphics and IBM 3279 Model S3G-type host graphics, both of which are supported by the Series 70 Personal Workstation, the vendor said.

The printer costs \$1,960.

Lee Data, 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

■ **Hermes Precisa International**, a Swiss-based manufacturer of office equipment, has introduced its 615 Color Printer to the U.S. market.

The 615 single-pass printer has eight-color printing capability at speeds of up to 600 char./sec in draft mode and up to 150 char./sec in correspondence quality.

The price of the 615 is \$2,695.

Hermes Precisa International, Printer Division, 1900 Lower Road, Linden, N.J. 07036.

■ **Davox Corp.** has released a printer adapter that is said to allow any workstation to output to any system printer, personal computer printer or its own screen printer.

The Series 410 Printer Adapter emulates IBM 3287 LU-1 and LU-3

printers and allows the output of Systems Network Architecture character stream data. This is said to permit the user to employ a variety of serial or parallel printers.

It costs \$2,195.

Davox, 4 Federal St., Billerica, Mass. 01821.

GRAPHICS SYSTEMS

■ **Metheus Corp.** has announced three members of its Omega series of color graphics controllers: the Omega 2300, the Omega 2400 and the Omega 2500.

The standard configuration of each of the Omega 2000 series includes a 256K-byte display-list memory and a transform processor. The

Continued on page 89

Gould extends supermini line
with low-end Power Node

FORT LAUDERDALE, Fla. — Gould, Inc. has released a low-end member of its Power series family of superminicomputers that runs under the company's UTX/32 operating system.

The desk-high Power Node (PN) 6031 has a 32-bit virtual CPU, 2M bytes of main memory, upgradable to 4M bytes of main memory.

It is said to be designed for use as a general-purpose, multiuser system running AT&T's Unix, a back-end computational node or a network file server.

The price of the basic PN6031 system is \$89,900 for the nucleus system with 2M bytes of memory, an 80M-byte, 8-in. Winchester subsystem, a ¼-in. cartridge magnetic tape system, console CRT, one additional eight-line asynchronous controller, an additional RS-232C panel and a power supply module, according to the vendor.

More information on the PN6031 system is available from Gould through P.O. Box 9148, 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33310.

Why Britton Lee's
relational database
software comes with
its own hardware.



Because database software, like a series of freight cars, adds weight. The more you add—inquiry requests, applications, additional data—the more demands you place on the engine. Total system execution is sacrificed. Britton Lee adds database software and its own engine, to pull more capacity at greater speeds.

SYSTEMS & PERIPHERALS

Continued from page 88

Omega 2000 series instruction set and Metheus-supplied graphics library software provide a virtual device interface that supports abstractions of the GKS and ACM-Siggraph Core graphics standards.

Price of the 2300 is \$10,950; the 2400 is \$13,950; and the 2500 is \$17,950 in single-unit quantities.

Metheus, P.O. Box 1049, Hillsboro, Ore. 97123.

POWER SUPPLIES

■ **MPL Power Systems PLC** has announced the CVT series of eight power conditioners, intended for applications where data processing systems and sensitive electronic equipment are affected by an unsta-

ble and poor-quality power supply.

The conditioners were designed for use with equipment requiring power supplies between 100VA and 2 kVA, 30Hz. The units are available for use on the following single-phase supplies: 220V or 240V, 50Hz; and 120V, 60Hz, the company said.

The price for the CVT series of power conditioners ranges from \$150 to \$850, the company said.

MPL Power Systems, 3011 Lincoln Ave., Richmond, Va. 23228.

■ **Product Technology International (PTI) Industries** has announced the Datashield Surge Protector, said to give a personal computer user automatic power control.

One of the unit's six sockets activates the automatic master switch (AMS) inside the surge protector.

When the power switch is used for any device inserted into the AMS socket, the remaining five sockets are activated and can be controlled by the switch of the equipment plugged into the AMS socket. Any peripheral containing 30W to 300W of power can be used.

The price for the Datashield Model AMS 110 Surge Protector is \$119.95, the vendor said.

PTI Industries, 320 River St., Santa Cruz, Calif. 95060.

■ **Helionetics, Inc.** has introduced a family of large commercial ac power sources. The line uses high-frequency pulse-width modulation, and the available models range from 12 to 72 kW in single-phase and three-phase versions.

The power sources are available in

variable (45Hz to 500Hz) or fixed (50Hz, 60Hz or 400Hz) frequency, one-phase or three-phase control. They can be used for motor generator replacement, receiving inspection and computer power conditioning and can handle mainframe-size computers.

Prices range from \$16,000 to \$61,000 for the one-phase units and from \$17,000 to \$64,000 for the three-phase units.

Helionetics, 17312 Eastman St., Irvine, Calif. 92714.

■ **Best Energy Systems, Inc.** has released two uninterruptible power supplies (UPS) which come equipped with on-board microprocessors and RS-232 ports, which allow the display of line power conditions at a terminal.

The UPS protect electronic equipment against blackouts, brownouts, spikes, sags, surges, noise and frequency shifts.

The Model 500 VA costs \$1,345 with 10-min backup. The Model 250 VA costs \$945 with 35-min backup.

Best Energy Systems, P.O. Box 280, Necedah, Wis. 54646.

■ **Oneac Corp.** has introduced its Power Interface product designed to provide power conditioning in a minicomputer environment.

The 20- by 21-in. Power Interface provides single-phase power requirements in the 7.5- and 10-kVA size range. The customer has a choice of hard-wired or user-specified connectors.

The price of the Power Interface ranges from \$5,000 to \$5,800 depending upon size.

Oneac, 2207 Lakeside Drive, Bannockburn, Ill. 60015.

■ **Power Distribution, Inc.** has announced the Model 516 Computer Power Center, said to protect processors and peripheral devices from electrical line noise and disturbances.

The product is based on the 8-bit Zilog, Inc. Z80 microprocessor, the company said. The Model 516's CRT displays system power status, including I/O voltages, current, time, date, temperature and humidity. The device is also said to monitor two internal transformer temperature alarms and eight building alarms.

Power ratings for the Model 516 range from 15 kVA to 225 kVA. Prices for the product start at \$15,000, the vendor said.

Power Distribution, P.O. Box 3145, 2510 Professional Drive, Richmond, Va. 23235.

■ **Cyberex, Inc.** has announced a family of uninterruptible power supplies (UPS) called Fifth Generation, featuring the ability to operate for hours or days from a backup engineer generator equal to the rating of the UPS.

A dc system is said to reduce distortion of input power and to feature high ac I/O efficiency. The system uses an inverter concept that is a combination of stepwave type and high-performance computer-compatible type, the vendor said.

The equipment is packaged in a front-accessible cabinet. The overall size of the 313 kVA, 250 kW three-

Continued on page 90

Relational database management systems provide the outstanding tool for easy-to-use, high level inquiries, for fast applications development, and for creation of an information resource for improved productivity.

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The heavy CPU demands and storage requirements can reduce general purpose mainframes (and all the applications running on them) to a crawl.

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Los Gatos, CA 95030



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The Intelligent Database Solution.



SYSTEMS & PERIPHERALS

Continued from page 89

phase UPS, split into two sections for shipment, is 145-in. wide by 36½-in. deep by 77-in. high, the vendor said.

The price for the product is approximately \$100,000, the vendor said.

Cyberex, 7171 Industrial Park Blvd., Mentor, Ohio 44060.

BOARD-LEVEL DEVICES

■ Proximity Technology, Inc. has announced Spell-ROM, said to detect errors and make corrections by use of five read-only memory (ROM) chips that store the Proximity/Merriam-Webster, Inc. linguistic data base.

Spell-ROM includes five 256K-bit ROM chips coupled with 8K bytes of

random-access memory. Four of the ROM chips store the 50,000 word linguistic data base, and the other ROM chip contains code to perform spelling error detection and correction.

The firm licenses the product to manufacturers and software developers only, for \$3.99 to \$21.90 per unit, depending on royalty arrangements.

Proximity, 3511 N.E. 22nd Ave., Fort Lauderdale, Fla. 33308.

■ Data-Sud Systems/U.S., Inc. has announced a dual-ported random-access memory (RAM) module that reportedly can be accessed from both the extended VME bus and VMX bus proposed architectural standards.

The DSSEDPRX-1 is said to be supplied with 128K bytes of 8K- by 8K-

byte static Cmos RAM. The DSSEDPRX-2 is supplied with the vendor's DSSEDPRX-P daughter-board, which extends the total capacity to 256K bytes. The board is also available unpopulated as the DSSEDPRX-0. The board is supplied with 15 Joint Electronic Device Engineering Council (Jedec) sockets and can support 8K by 8K bytes of Jedec erasable programmable read-only memory devices, the vendor said.

Jumper-selectable VME bus memory access times can reportedly be set between 150 and 300 nsec, while VMX bus access time can be set between 180 and 330 nsec.

Prices for the boards are DSSEDPRX-0, \$1,295; DSSEDPRX-1, \$2,295; DSSEDPRX-2, \$3,995; and DSSEDPRX-P, \$1,995.

Data-Sud Systems, Suite J, 2219 S. 48th St., Tempe, Ariz. 85282.

■ General Micro Systems, Inc. has announced a VME bus module said to provide serial and parallel I/O. The unit is also said to be software-programmable.

The GMSV01 is said to be the first module to offer up to eight asynchronous serial communications channels and 24 parallel I/O lines plus an on-board control latch that permits software configuration control. According to the vendor, the module meets all VME double-width specifications for timing, signal levels and physical dimensions.

Each of the eight serial channels can be selected to operate on RS-232 or RS-422 standards and can be connector-selected for either data terminal equipment (terminals) or data communications equipment (modems) operation, with no strapping required, the vendor said.

The 24 parallel I/O lines can offer one Centronics Data Computer Corp.-type printer port plus 12 additional bidirectionally buffered lines or two printer ports, the vendor said. An on-board control latch is said to permit interrupt on any level, one to seven, to allow for masking the interrupt for the 24-bit timer and also to permit polled operation of the modules.

The GMSV01 is priced at \$1,130.

General Micro Systems, 4740 Brooks St., Montclair, Calif. 91763.

■ Data Translation, Inc. has announced its DT772 series of analog input systems for 8-bit and 16-bit Intel Corp. Multibus systems.

The DT772, DT774 and DT778 are board-level devices that reportedly feature 24-bit addressing capabilities and are compatible with the IEEE-796 Multibus specification.

The DT772 is for high-level analog input, the DT774 for low-level analog input and the DT778 for simultaneous sample and hold analog input, according to the vendor. All are said to include an on-board clock and support for multiple operating modes.

The DT772 costs from \$895 to \$1,095; DT774 from \$995 to \$1,195; and the DT778 from \$1,295 to \$1,695. Prices vary according to the number of input channels ordered.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01742.

■ Connecticut Microcomputer, Inc. has introduced a four-channel binary coded decimal (BCD) input module that is a self-contained IEEE-488 bus device.

The Busster MA4-G works with any computer system that has an IEEE-488 bus either built in or added on and is programmed through Basic commands from the controlling computer.

The MA4-G accepts commands from the host to read up to four 3½- or 3¼-digit BCD meters or to activate the timer and buffer.

The Busster MA4-G sells for \$695, which includes case and power supply.

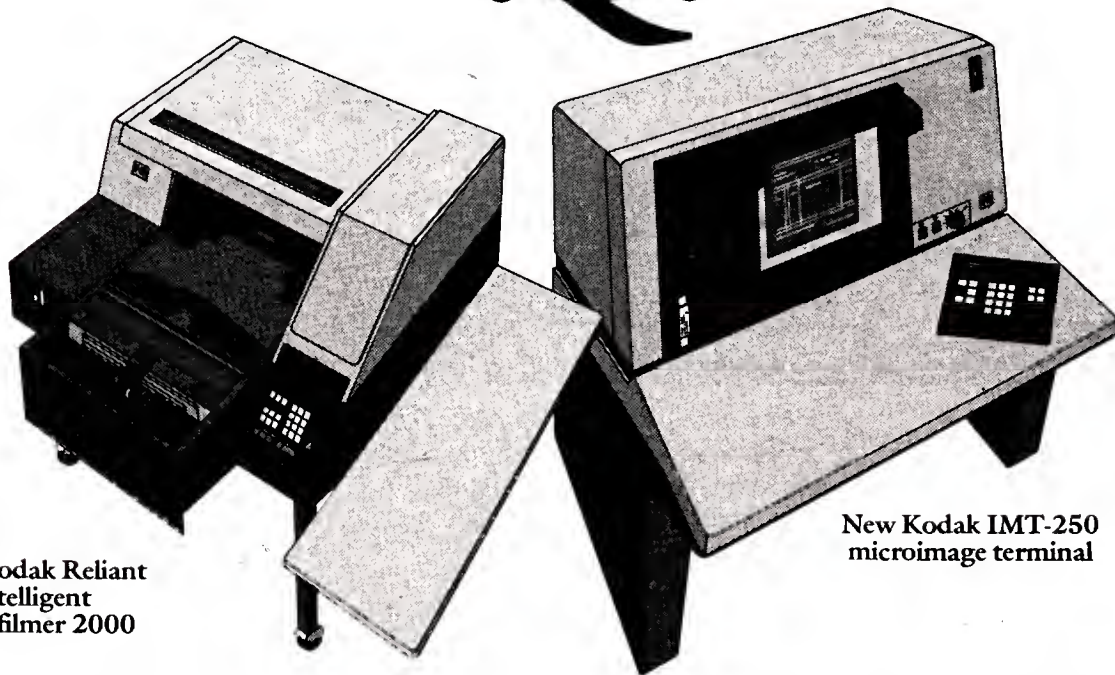
Connecticut Microcomputer, 568 Danbury Road, New Milford, Conn. 06776.

■ Dyna Five Corp. has announced a Digital Equipment Corp. Q-bus expander said to allow Micro PDP-11 or Microvax users to double the number of backplane slots and the amount of electrical power available.

Continued on page 92

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	IBM	5152	36	494

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	C. ITOH	A10-20S	29	\$ 669
	QUME	LP20	20	799
	NEC	2010	20	950
	DIABLO	620	20	995
	C. ITOH	F10-55	58	1,449
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	QUME	1155	55	1,995
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SYSTEMS & PERIPHERALS

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able to them.

The D5-BE100-A expansion module with 16-, 18- and 22-bit addressing is said to allow an eight-quad slot expansion backplane to be added using a dual-height board in the Micro PDP-11 or Microvax and one in the expansion enclosure.

Applications for the product include data acquisition and process control for analog and discrete I/O signals, communications systems supported by added power and backplane space and larger peripheral configurations.

The price for the D5-BE100-A expansion module is \$650 per pair, one in the CPU and one in the expander box, the company said.

Dyna Five, 12040 Western Ave., Garden Grove, Calif. 92641.

■ Intel Corp. has introduced an expandable communications board said to be designed for multiuser and distributed processing needs. The company also introduced two expansion boards that reportedly can be used to increase the memory and I/O capabilities of the communications board.

The ISBC 188/48 is said to distribute processing functions by off-loading data from a host computer. It can function as a cluster controller, a front-end processor or a stand-alone system, the vendor said.

The board is said to contain eight I/O channels, dual-port random-access memory (RAM) and sites for programmable read-only memory/erasable programmable read-only memory.

It is said to have the intelligence and speed to manage multiuser and multiprotocol communications tasks.

The two Multimodule expansion boards reportedly can be used to increase the capabilities of the 188/48. The ISBC 307 board can increase on-board RAM to 192K bytes with parity, the vendor said, while the ISBX 354 board adds two serial I/O channels to any board with ISBX connectors.

The ISBC 188/48 is priced at \$2,995.

The ISBX 354 and ISBC 307 expansion boards cost \$450 and \$800, respectively, according to the vendor.

Intel, 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97123.

■ DY-4 Systems, Inc. has announced a Zilog, Inc. Z80 microprocessor-based CPU card with math processor for the standard bus and an optional 9511A or 9512 floating-point arithmetic processor.

The DSTD-109 is provided with one RS-232C serial I/O

channel using the Motorola, Inc. 6850 Asynchronous Communications Interface Adapter.

Three 28-pin sockets can accept various combinations of read-only memory, erasable programmable read-only memory or static random-access memory (RAM), the vendor said.

The DSTD-109 is said to generate all address and control signals needed to refresh dynamic RAM.

The price for the DSTD-

109, aimed at number-crunching applications beyond the capabilities of the Z80, is \$559, according to the vendor.

DY-4 Systems, Suite 202, 1475 S. Boscom Ave., Campbell, Calif. 95008.

AUXILIARY EQUIPMENT

■ AT&T Information Systems has introduced the

AT&T FAX 3510D thermal printing facsimile machine, said to be capable of automatically feeding a stack of up to 30 pages for transmission.

The product conforms to CCITT facsimile standards to assure compatibility with older and newer machines, the vendor said.

Features of the 3510D include near-letter-quality resolution of 200 by 200 dot/in. and a transmission rate of 20 sec. This compares with 4 to

6 min/page for the oldest machines and 2 to 3 min for newer models, according to AT&T.

Other features of the FAX 3510D are self-diagnostic capabilities, 12-in. by 17-in. desktop size and a weight of less than 30 lbs, the vendor said.

The price for FAX 3510D, available now, is \$3,495, the vendor said.

AT&T Information Systems, 100 Southgate Pkwy., Morristown, N.J. 07960.



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Within the PC environment, today's RAMIS II integrates the best of mainframe and desktop technologies in a strategy designed for corporate

SYSTEMS & PERIPHERALS

■ **Data Innovations, Inc.** has announced the **DI100** and **DI200** computer image film recording systems, said to produce computer-generated photographs from any minicomputer or supermini with an RS-232 port.

The systems are said to produce slides, negatives or prints in either color or black and white. Each system consists of a Data Innovations graphics processor board and a Polaroid Corp. Palette computer-image film recorder.

The processor board is said to create a bit-mapped image from any graphics software supporting Hewlett-Packard Co. 7475 or Tektronix, Inc. 4010/4014 protocols. Both products can produce slides in 35mm format, and both offer four color planes with an unlimited color palette and a resolution of 864 by 576 pixels, the vendor said.

The company's graphics board includes a NEC Information Systems, Inc. 82720

8-bit graphics display controller and an Intel Corp. 8051 8-bit microcontroller, a spokesman said.

The Data Innovations system is available either as a DI100 graphics board that plugs into an expansion slot on a Digital Equipment Corp. VT100 terminal or, as the DI200, in a packaged version with its own power supply.

The price for the board and the Polaroid film recorder is \$3,600. The price for the DI200 graphics processor

board with its own power supply, which can be connected to any terminal with an RS-232 output, and Polaroid film recorder is \$4,200.

Data Innovations, 660 Suffolk St., Lowell, Mass. 01854.

■ **Hewlett-Packard Co.** has announced a bit-error rate test set that contains the tests that are needed for verifying proper network installation and trouble-

shooting of data links.

The HP 4925B is said to be able to analyze analog impairments and perform digital measurements. It reportedly can test high-speed AT&T Dataphone Digital Service circuits that employ V.35 interfaces. The basic price of the HP 4925B is \$1,195, and many options are available.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304.

■ **Telamon, Inc.** has announced the **Console Engine**, said to provide security for remote-console access to the Hewlett-Packard Co. HP 3000 supermini-computer.

The Console Engine interface requires a password from anyone dialing into the HP 3000's remote console port and can also be set up to require validation from another Console Engine at the caller's end.

The engine is said to recognize system halts and console messages indicating conditions such as data base problems or program aborts and responds by automatically dialing an assigned message-logging terminal to notify the operator on call.

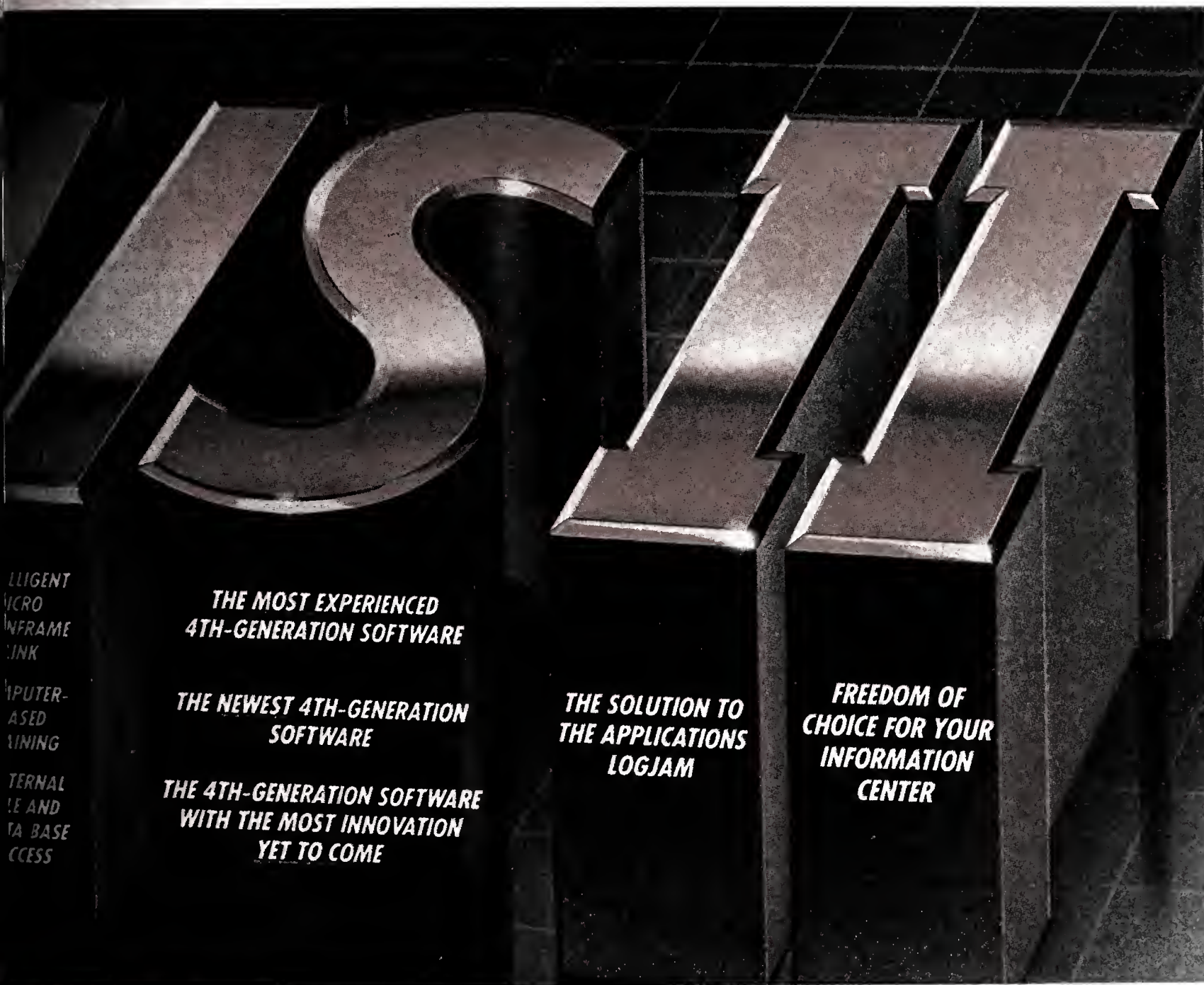
The Console Engine is priced at \$2,150.

Telamon, 11th Floor, 1615 Broadway, Oakland, Calif. 94612.

■ **Analog Devices, Inc.** has announced the **1S64** series of four resolver-to-digital converters (RDC) for measuring voltage and mechanical motion, said to be capable of replacing mechanical tachogenerators.

According to Analog Devices, the 1S64 series RDCs provide a velocity output with 0.1% linearity. The devices develop a velocity output with a reported digital angular position output of 10

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SYSTEMS & PERIPHERALS

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to 16 bits and a voltage output proportional to speed of rotation.

The single-unit price of the 1S64 series in quantities of 100 or more is \$157 to \$479, depending on resolution and temperature range, the vendor said.

Analog Devices, Two Technology Way, Norwood, Mass. 02062.

■ RVS Electronics, Inc. has introduced the Model SS-24 two-position computer switch, which provides for interfacing of most computers with two printers or other RS-232 devices.

The Model SS-24 switch is equipped with A and B ports and an Off mode and can be positioned on metal, plastic or wood surfaces with a variety of mounting attachments.

The switch is priced at \$75 for one; \$64 in quantities from 25 to 99; and \$42 for 100 to 500 units.

RVS Electronics, P.O. Box 87, Circleville, N.Y. 10919.

■ The Computer Products Measurement and Control Group has announced its Q-Bus Direct Memory Access Input/Output Bus Converter, which is compatible with any Digital Equipment Corp. Q-bus-based computer system.

The product allows customers to assemble their own data acquisition and control system with the advantage of direct memory access transfers on the DEC Q-bus.

The converter is priced at \$1,450.

Computer Products Measurement and Control Group, 2900 Gateway Drive, Pompano Beach, Fla. 33069.

CADMUS from page 87

The package is priced at \$20,000 and is available from Neo-Visuals in Willowdale, Ont., Canada.

LLMS, development system offered

Also available is the Leverage List Management System (LLMS) from Unisource Software Corp. The LLMS runs on the Cadmus 9700 family of workstations under Cadmus' operating system, which is the University of California at Berkeley's Unix 4.2 BSD, with Cadmus' Unison proprietary distributed file system.

The LLMS is a relational data base for business applications that is built around a full screen editor specifically designed for data handling, according to the vendor. The system reportedly offers menu-driven, mail-merge utilities for producing

form letters and mailing labels. Commands may be stored in Unix shell scripts for reuse.

LLMS is priced at \$385 and is available from Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

Cadmus has also introduced its Development System for the Motorola, Inc. 68020 processor. The Development System comprises a Cadmus 9730 computational workstation with a 68010 processor; the monochrome graphics subsystem including Cadmac graphics software; and 68010/68020 C and Fortran 77 compilers.

The Development System is priced at \$21,790 and will be available from Cadmus in the second quarter of 1985.

More information is available from Cadmus Computer Systems, 600 Suffolk St., Lowell, Mass. 01854.

OA from page 87

lator module, which is priced at \$1,500.

Datapoint also enhanced its RMS operating system. Enhancements include teletypewriter access to information networks and mainframes for \$1,000; a virtual communications facility that supports X.25 protocol and Open Systems Interconnect compatibility for \$1,500; and support of IBM 3270 terminal emulation with SNA compatibility for \$1,500. Prices are waived under certain conditions for RMS users with current maintenance agreements.

Datapoint is located at 9725 Datapoint Drive, San Antonio, Texas 78284.

PARADYNE from page 87

disk. Printer output from microcomputer applications can be spooled to the server and printed on loop-attached printers.

Available immediately, the newly announced models are as follows:

■ The Model 7812-01, a 12-in. CRT terminal said to be a replacement for an IBM 3178-type terminal, for \$1,525.

■ The Model 7812-02, a 12-in. CRT terminal that features IBM 3278 Model 2 emulation. Other features include 80-col. by 24- or 32-line screen formats, up to 640K bytes of RAM and standard asynchronous, parallel and local disk ports. It costs \$2,100.

■ The Model 7812-03, which features the same basic capabilities as the Model 7812-02 but also includes monochrome graphics capabilities, for \$2,595.

■ The Model 7814-02, a 14-in. CRT terminal that features emulation for IBM 3378 Model 2, 3, 4 and 5 terminals. It has the same basic features as the 7812-02 and costs \$2,400.

■ The Model 7814-03, an enhanced version of the 7814-02 that includes the capability to perform IBM Personal Computer graphics, for \$2,895.

■ The 7913-01, a 13-in. color terminal that features graphics capabilities. The unit can emulate IBM 3279 Model 2B and 3B terminals and offers 16 colors. It costs \$3,150.

A controller/server unit costs \$4,000, and the 360K-byte floppy disk drive costs \$1,600. The 10M-byte Winchester disk drive costs \$2,900.

Paradyne is located at 8550 Ulmerton Road, Largo, Fla. 33540.

The Price Of Compatibility Just Went Down

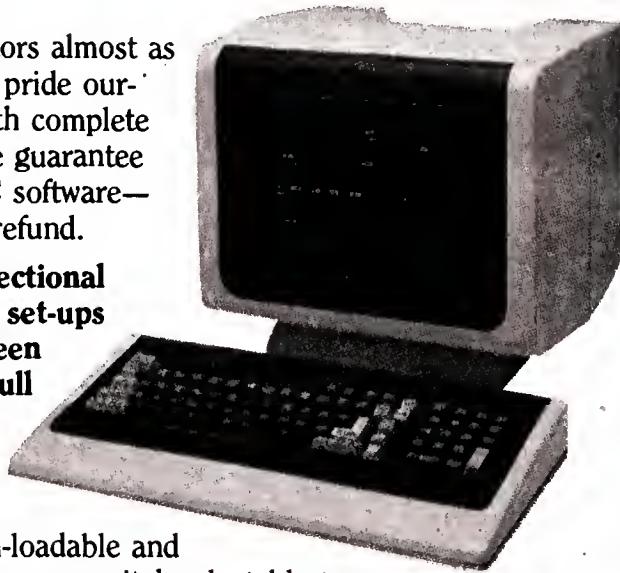


Micro-Term has been manufacturing VT100-emulators almost as long as DEC has been manufacturing VT100s. We pride ourselves on designing and manufacturing products with complete emulations, and the ERGO301 is no exception. We guarantee that our ERGO301 will correctly operate your DEC software—all of it. If we are wrong, return the unit for a full refund.

Standard features: advanced video standard • bidirectional printer port • two pages of memory • plain English set-ups • user-programmable function keys • green screen with screen saver • superior 132-column clarity • full one-year warranty.

Also available is the ERGO301FK (function keys) terminal with total DEC VT100 compatibility, plus 20 function keys that are user-programmable, down-loadable and savable in non-volatile memory. The 20 function keys are switch-selectable to let you choose DEC VT220 or TeleVideo 970 defaults. The ERGO301FK includes all the standard features of the ERGO301 at a list price of only \$745.

An optional ReGIS and Tektronix 4010 add-on graphics board is available for the ERGO301 and ERGO301FK for only \$595.



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MICROCOMPUTERS

Higgins gets thumbs-up

Early users applaud desktop organizer program

By Eric Bender
CW Staff

Conetic Systems, Inc.'s Higgins package for the IBM Personal Computer XT, billed as an administrative assistant, successfully deals with a stream of small but crucial tasks facing white-collar workers each day, according to early users' reports.

"I use it all day, and I would be lost without it," said Gene Dougherty, a regional sales manager for Nashua Computer Products in San Mateo, Calif., who said he depends on the software to handle customer information, scheduling and word processing.

Kristina Case, a vice-president at Secu-

rity Pacific National Bank in San Francisco, logs meetings and tracks projects with Higgins. "I just find it very comfortable to use," she commented.

Higgins integrates nine modules — time manager, directory, to-do list, personal files, calculator, expense reporter, scratch pad, clock and tickler reminder — with a common data base. The package also includes global information retrieval through key words, along with the ability to create macros or links to external PC-DOS files.

In addition to accessing his customer contact information through Higgins's di-

See **ASSIST** page 103

Borland announces Superkey

SCOTTS VALLEY, Calif. — Superkey, a program for creating macros that offers automatic data encryption, has been introduced by Borland International for the IBM Personal Computer line.

Like Borland's Sidekick desktop management package, the \$69.95 Superkey package resides in random-access memory. It reportedly permits users to create and work with macros, a series of keystroke commands executed by striking one key,

while working with their main applications program.

Users can use Superkey to define, edit, save, load and recall macros and can bring up, move around in and exit the program with single keystrokes, according to the vendor. Superkey's full screen macro editor can be pulled down on top of the main program, and its display-only macros can be customized on the screen without being

See **MACRO** page 118

Dangers in micro project management

By Douglas Schoenberg
Special to CW

Microcomputers are sprouting on every desk. After the spreadsheet, word

Schoenberg works in marketing at AGS Management Systems, Inc. in King of Prussia, Pa., which supplies both mainframe and microcomputer project management software.

processor and data base manager are installed, the project management system is not far behind.

Why are microcomputers taking over this task, which was once solely the domain of large mainframes? The reasons are not hard to see.

Traditional mainframe-based project management required project managers to spend weeks learning the intricacies

See **MICRO** page 117



SMALL TALK
Ed Warner
CW Staff

Which micro is wrong one?

With the Super Bowl now a part of history, we are left only to ponder its biggest enigma — Apple Computer, Inc.'s annual supercommercial. Last year's Apple offering presented us with a Blue-tinted Big Brother, this year's with a line of blindfolded executives whistling blithely — as they marched off a cliff.

And the meaning of it? My theory is that the blindfolded executives who traipsed over the edge knew where they were going. They were committing a corporate version of hara-kiri for having bought the wrong personal computer. And what qualities might make a personal computer the wrong one for business? For starters, consider the following:

- Lack of color display. A bar chart of your sales vs. those of the competition is nothing unless your sales are in Royal Blue and theirs are about the same color as battery acid.

- Use of a mouse in place of additional keys. Mice are cute — for doodling. Business users, though, prefer a numeric keypad for spreadsheets and function keys for word processing.

- Has few business applications written for it. Some people would like a variety of choices beyond two word processors.

From the foregoing, one thing becomes obvious: It is not the IBM Personal Computer that we are talking about here. Despite Apple's attempt to paint IBM as either Big Blue Brother or the producer of a product that might drive you to the cliff's edge in humiliation, its advertising ignores the fact that corporate microcomputer managers have been buying the Personal Computer in droves — and loving it.

See **AD** page 102

■ Sorcim/IUS Micro Software enhances the Easywriter II word processing package and the Easyplus windowing system/96

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Sorcim enhances Easywriter, Easyplus

Adds line drawing, printer selection, windowing net interface

SAN JOSE, Calif. — Sorcim/IUS Micro Software, a division of Computer Associates International, Inc., has announced enhancements to its Easywriter II word processing package and its Easyplus 1.1 windowing system, both for the IBM Personal Computer.

It also announced the addition of Plus Series Networking, a network interface for Easyplus.

Easywriter II Version 4.0 reportedly now offers line drawing capability and automatic printer selection. Lines drawn under Easywriter II, using the cursor control keys, will be

useful for charts and graphs, the vendor said.

An additional enhancement in Easywriter II Version 4.0 reportedly is supported under the Easyplus 1.1 windowing system, introduced by Sorcim/IUS in August 1984.

The enhanced version of Easyplus 1.1, meanwhile, will reportedly be available in March and will offer windowing of Sorcim/IUS's Supercalc3, a spreadsheet, and Superproject, a project management package. Easyplus 1.1 will also be able to provide windows for the packages of other vendors, including Lotus Development Corp.'s 1-2-3, Ashton-Tate's

Dbase II and Micropro International Corp.'s Wordstar, according to the vendor.

Plus Series Networking reportedly will provide an interface of the Easyplus 1.1 windowing system to 3Com Corp.'s 3Com Network.

Plus Series Networking is priced at \$600 per unit of access and is due for release in April.

Easywriter II is priced at \$395, and Easyplus is priced at \$149.

More information is available from Sorcim/IUS, located at 2195 Fortune Drive, San Jose, Calif. 95131.

Hayes trims 1,200 bit/sec modem costs

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has dropped prices on its 1,200 bit/sec modems, effective this month.

The price of the Smartmodem 1200 will decrease from \$699 to \$599, and cost of the Smartmodem 1200B will be reduced from \$539 to \$489. The price of the Smartmodem 1200B bundled with Smartcom II communications software will drop from \$599 to \$549.

Hayes is located at 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

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Robert Goodman chose MCBA software for good, solid reasons.

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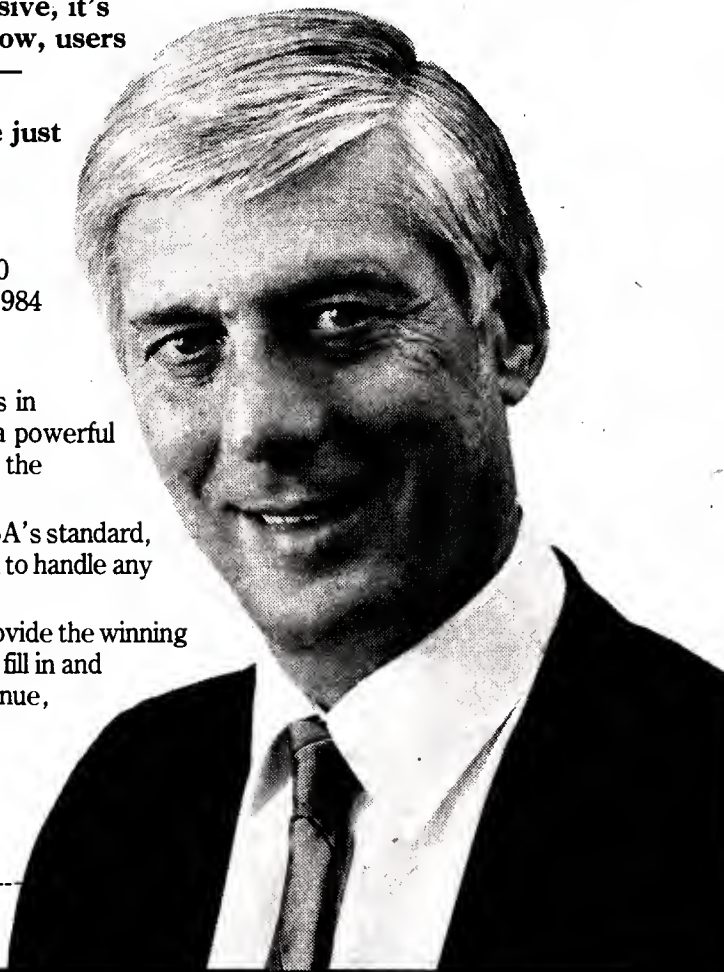
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SOFTWARE

■ Infostructures, Inc. has introduced Fact Cruncher, outline processing software for the IBM Personal Computer with word processing and project management features.

Fact Cruncher reportedly supports outlining, charting, data base manipulation and program editing. Its outliner is said to offer move, search, copy, replace, insert, delete and undo functions.

When lines are rearranged under Fact Cruncher, indentation is changed automatically, the vendor said. Outlines can be charted into boxes that are arranged in a tree-structured hierarchy, the vendor added. The word processor reportedly offers centering, right justification, emphasized print and title lines and footers.

Fact Cruncher is priced at \$295. Infostructures, P.O. Box 32617, Tucson, Ariz. 85751.

■ Datamate Co. has introduced Jetset, a set of utilities for use with a Hewlett-Packard Co. Laserjet printer connected to the IBM Personal Computer or HP 150 personal computer.

The two utilities are Setlaser and Runoff. Setlaser reportedly executes a string of commands that initialize the printer and direct its output to the communications port. It also is said to display a menu that provides access to the Laserjet's formatting capabilities, such as typeface and lines per inch.

Runoff, a text formatting program, reportedly allows users to change typefaces and to set tab stops, margins and page feeds from within the document being printed. Users also can generate titles at the head or foot of the page, underline portions of text or have the program generate page numbers, the vendor said.

Jetset is priced at \$79. Datamate, Suite 128, 4135 S. 100 East Ave., Tulsa, Okla. 74146.

■ The Programmed Press has introduced Version 1.2 of its Statistical Software package for the IBM Personal Computer line.

Statistical Software reportedly contains 20 interactive programs for data analysis and forecasting. Forecasting capabilities for multiple cor-

MICROCOMPUTERS

relation and regression analysis are included, according to the vendor.

The software is said to be able to perform linear and logarithmic trend projections, move averages and perform exponential smoothing. It reportedly requires a Personal Computer with one diskette drive and 128K bytes of internal memory.

Statistical Software is priced at \$100. A \$19.95 handbook, which lists all programs in Basic, is also available.

Programmed Press, 2301 Baylis Ave., Elmont, N.Y. 11003.

■ **Florida Systems Consulting Group, Inc.** has announced **Screen Painter** and **Screen Handler** software for developing commercial applications under AT&T's Unix System V on AT&T's 3B2 CPU.

The package is intended for application programmers who are developing software for multiuser computers under Unix. Written in C, the Screen Painter and Screen Handler provide a standard set of C function calls to control terminal I/O from a variety of terminal types.

The Screen Painter is a menu-driven tool for defining screen maps that are used by Screen Handler for managing terminal I/O, the company said.

The license fee for source code and documentation for the package is \$7,500, the vendor said.

Florida Systems, 7954 Baymeadows Way, Jacksonville, Fla. 32216.

COMMUNICATIONS

■ **Western Digital Corp.** has introduced its **WD4025** packet-switching data communications controller board for use with the IBM Personal Computer line.

The board features the Western Digital WD2511 controller, an X.25 controller chip that reportedly incorporates on-board data security. The WD2511 has been certified for GTE Telenet, Tymnet, Inc.'s Tymnet and other networks, a Western Digital spokeswoman said.

The WD4025 reportedly will link computers at the same site or in other areas via dial-up, leased lines or a packet-switched network.

The WD4025 is priced between \$423 and \$579 without the X.25 protocol and between \$1,023 and \$1,379 with X.25.

Western Digital, 2445 McCabe Way, Irvine, Calif. 92714.

■ **Epson America, Inc.** has introduced a multiunit, which combines a snap-on modem reportedly capable of transfer at up to 300 bit/sec and a 64K random-access memory disk, and telecommunications software, both for the company's Gene-

va portable computer.

The telecommunications software, Geneva Connection, reportedly is provided on a read-only memory cartridge that can be inserted into the Geneva portable computer. The software is said to permit telecommunications with remote computers using an add-on modem, external modem or acoustic coupler.

The multiunit is priced at \$360. The Geneva Connection is \$79.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505.

■ **Polygon Associates, Inc.** has introduced its **Poly-COM240** software package, which provides the IBM Personal Computer with Digital Equipment Corp. VT125/VT240 graphics terminal capabilities.

Poly-COM240 reportedly allows

users to access DEC's Datatrieve, Decslide and Decgraph; SAS Institute, Inc.'s Sasgraph; Bolt Beranek and Newman, Inc.'s RS/1; and others. It is said to be offered with Poly-XFR software for error-free file transmission.

Poly-COM240 is priced at \$300. Current owners of Polygon's Poly-COM or Poly-TRM/VT will be able to upgrade for \$125.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

■ **Interlan, Inc.** has expanded the services of its Net/Plus systems product line with the announcement of a Network Communications Server/Internet Router (NCS/IR) and Network Management Utilities that run on the IBM Personal Computer.

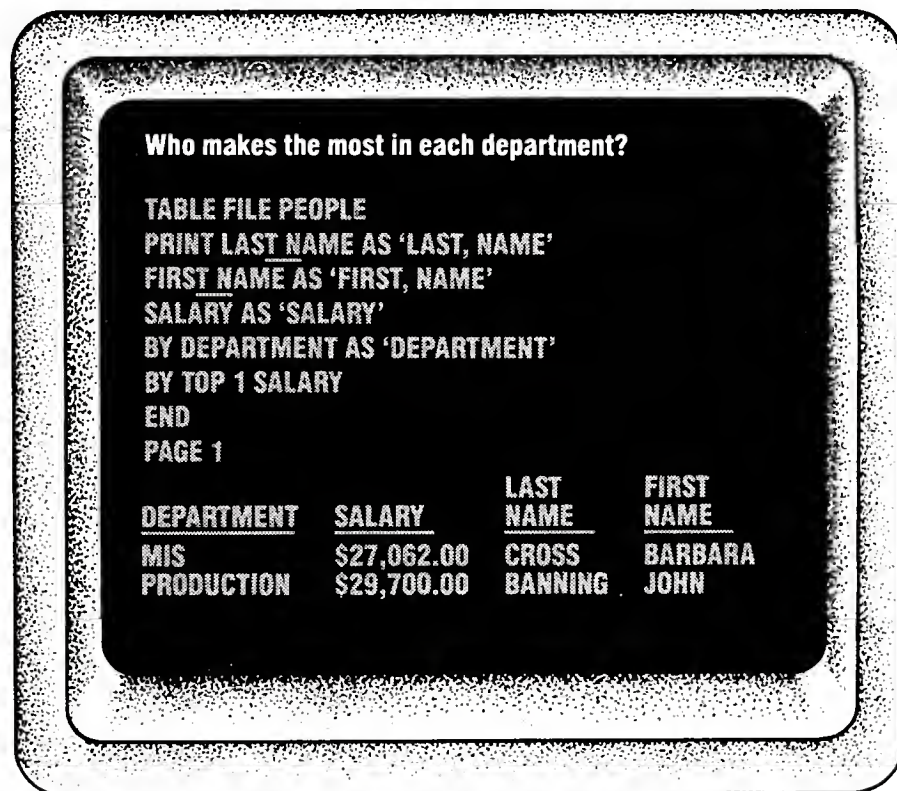
According to a spokesman, NCS/IR provides transparent data transmission between two physically separate Ethernet lines at speeds up to 224K bit/sec. Packets are routed across one or two dedicated synchronous data links using the Xerox Corp. XNS and ITP protocols.

The Network Management Utilities run on the IBM Personal Computer, Personal Computer XT, Personal Computer AT or Compaq Computer Corp. Compaq and provide a method for controlling a large collection of network terminal servers and other Interlan servers on an Ethernet line, the vendor said.

In addition, the NCS/IR reportedly lets users transparently initiate both interactive and file transfer sessions between nodes on two different Ethernet lines, Interlan said. The routing

Continued on page 98

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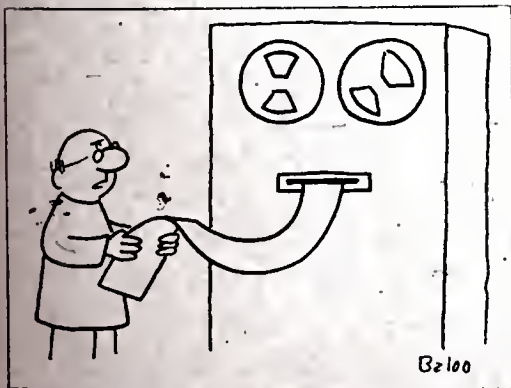
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MICROCOMPUTERS

Continued from page 97

is accomplished via the XNS Internet Protocols. The product's use of the XNS ITP protocol is said to provide full compatibility with Interlan's other system products.

Network Management Utilities provide a network operator with tools for controlling servers on an Ethernet line and allow microcomputer management to service boot requests from any server on the network, the vendor said.

NCS/IR is priced at \$6,500, and the Network Management Utilities are priced at \$1,000, including an IBM Personal Computer-compatible Ethernet controller board and diagnostic software.

Interlan, 3 Lyberty Way, Westford, Mass. 01886.

■ **Hayes Microcomputer Products, Inc.**, has introduced versions of its Smartmodem 300 and Smartmodem 1200 for the Apple Computer, Inc. Macintosh.

The Smartmodem 300, a direct-connect modem, reportedly offers full- and half-duplex operation, unattended answering and calling abilities at speeds up to 300 bit/sec. Users can call via either a Touch-Tone telephone or pulse dialing, Hayes said.

The Smartmodem 1200 is said to have the same features as the 300 bit/sec unit.

Smartmodem 300 costs \$289; Smartmodem 1200 is priced at \$699.

Hayes Microcomputer Products, 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

■ **Cambridge Computer Corp.** has enhanced its PC77/78 and PC/FTF Honeywell, Inc. terminal emulation packages that run on the IBM Personal Computer line.

PC77/78 reportedly emulates the Honeywell VIP7700 and VIP7800 series of asynchronous terminals. On the Personal Computer AT, the product allows access to the host via multiple windows and provides for remote printing simultaneously with host inquiries and updates, the vendor said.

PC/FTF is a polled VIP file transfer facility said to emulate the transfer of files from a Honeywell host to a Honeywell DPS 6 Level 6 minicomputer system.

PC77/78 is priced at \$795. PC/FTF costs \$150.

Cambridge Computer, 151 Bender Road, Mount Carmel, Conn. 06518.

STORAGE

■ **Data Technology Corp.** has announced Teammate 1120AT and 1132AT, hard disk storage systems for the IBM Personal Computer AT.

The Teammate 1120AT supplies 20M bytes of storage and the Teammate 1132AT provides 32M bytes of storage, Data Technology said.

Teammate models plug into a Personal Computer AT's controller and include cables, installation guides, slides for mounting the drives and Infotools, Inc.'s Backup, a backup software program that normally sells for \$150, the vendor said.

Teammate 1120AT costs \$1,295, and Teammate 1132AT costs \$2,495.

Data Technology, 2775 Northwestern Pkwy., Santa Clara, Calif. 95051.

■ **Davong Systems, Inc.** has announced that it has expanded the capacity of its hard-disk storage system for the IBM Personal Computer, Personal Computer XT and Personal Computer AT.

The vendor's Fixed Disk System is said to provide 86M bytes of formatted Winchester drive storage for programs and data files. The unit is housed in a cabinet that fits under the IBM monitor. An indicator light panel allows the user to monitor disk activities, the vendor said.

Both versions of the vendor's software are said to work with the expanded capacity unit. They are the standard Fixed Disk Software, which is shipped with the unit, and the optional Multi-OSR software, which offers higher performance, Davong said.

The 86M-byte unit is priced at \$6,995.

Davong Systems, 217 Humboldt Court, Sunnyvale, Calif. 94089.

■ **Mom Corp.** has introduced its Max Disk Drive, a 10M-byte removable cartridge disk drive for the IBM Personal Computer AT.

The Max Disk Drive reportedly can back up 10M bytes in 90 seconds.

An overflow cartridge feature reportedly advises the operator to insert a new cartridge.

The drive reportedly uses an air gap to prevent the read/write heads from contacting the disk surface.

The Max Disk Drive for the AT is priced at \$2,895 in its single-drive version and \$3,995 in its dual-drive version.

Mom, Two Northside 75, Atlanta, Ga. 30318.

■ **RMTC Systems** has introduced Porta-Tape, a 10M-byte tape backup system for the IBM Personal Computer XT.

The tape system reportedly attaches to the XT's 37-pin floppy drive port. The package includes software that backs up the tape, either in streaming or in file-by-file mode, the vendor said. In streaming mode, a hard disk drive reportedly can be backed up in less than 10 minutes.

The product costs \$1,495.

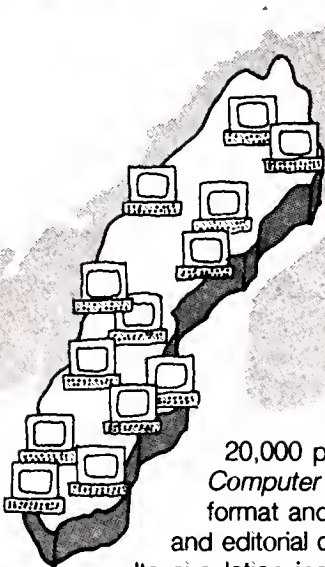
RMTC Systems, P.O. Box 456, Boulder, Colo. 80306.

■ **Distributed Logic Corp. (Dilog)** has announced four controller products and associated software for integrating large disk drives and backup tape drives to Digital Equipment Corp.'s Microvax-1.

The devices are the Micro Tape MV132, which includes a Dilog

Continued on page 102

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Relative Price Performance Index
*Computerworld, August 20, 1984

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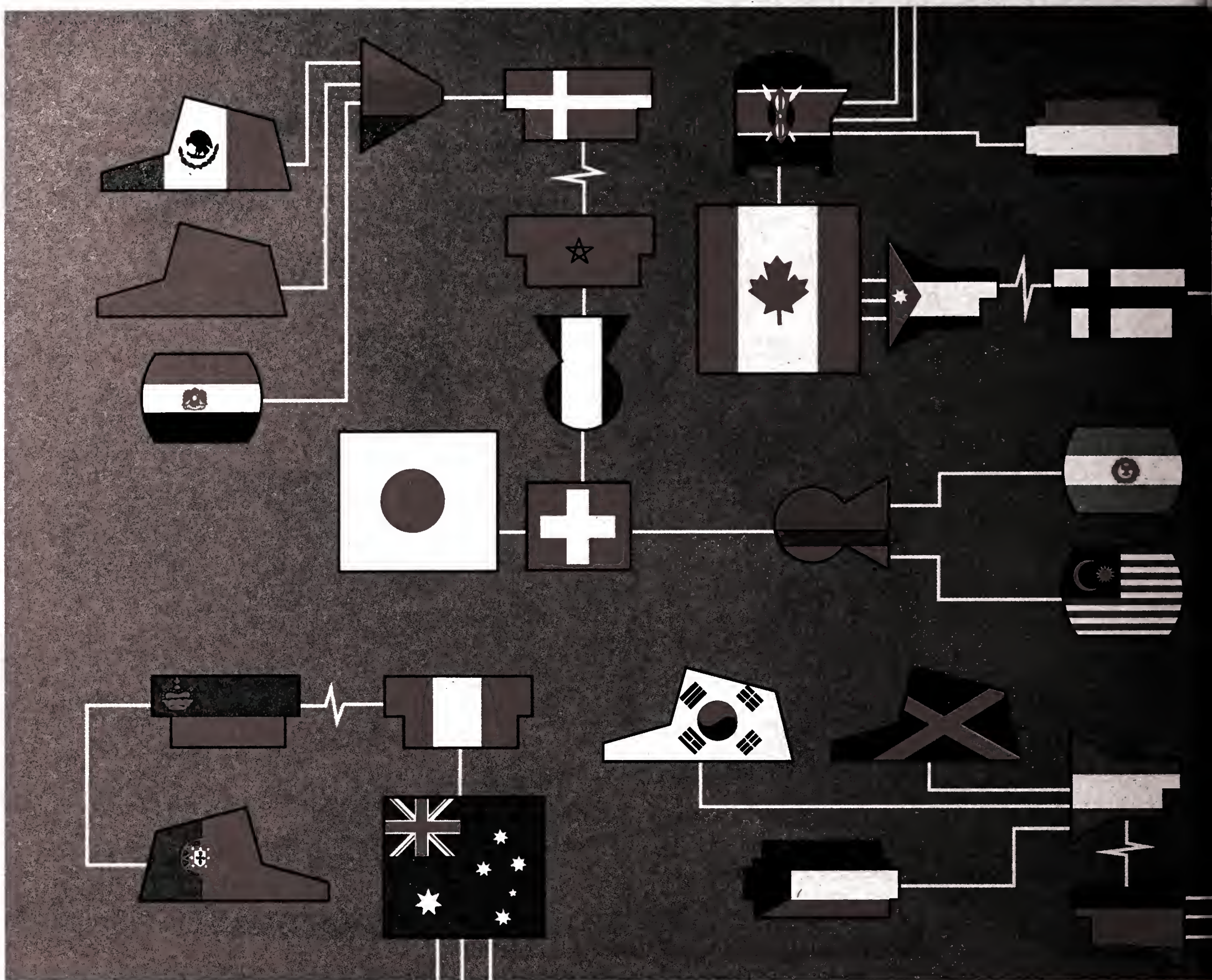
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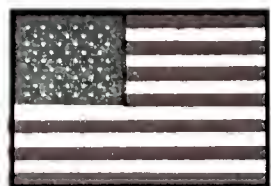
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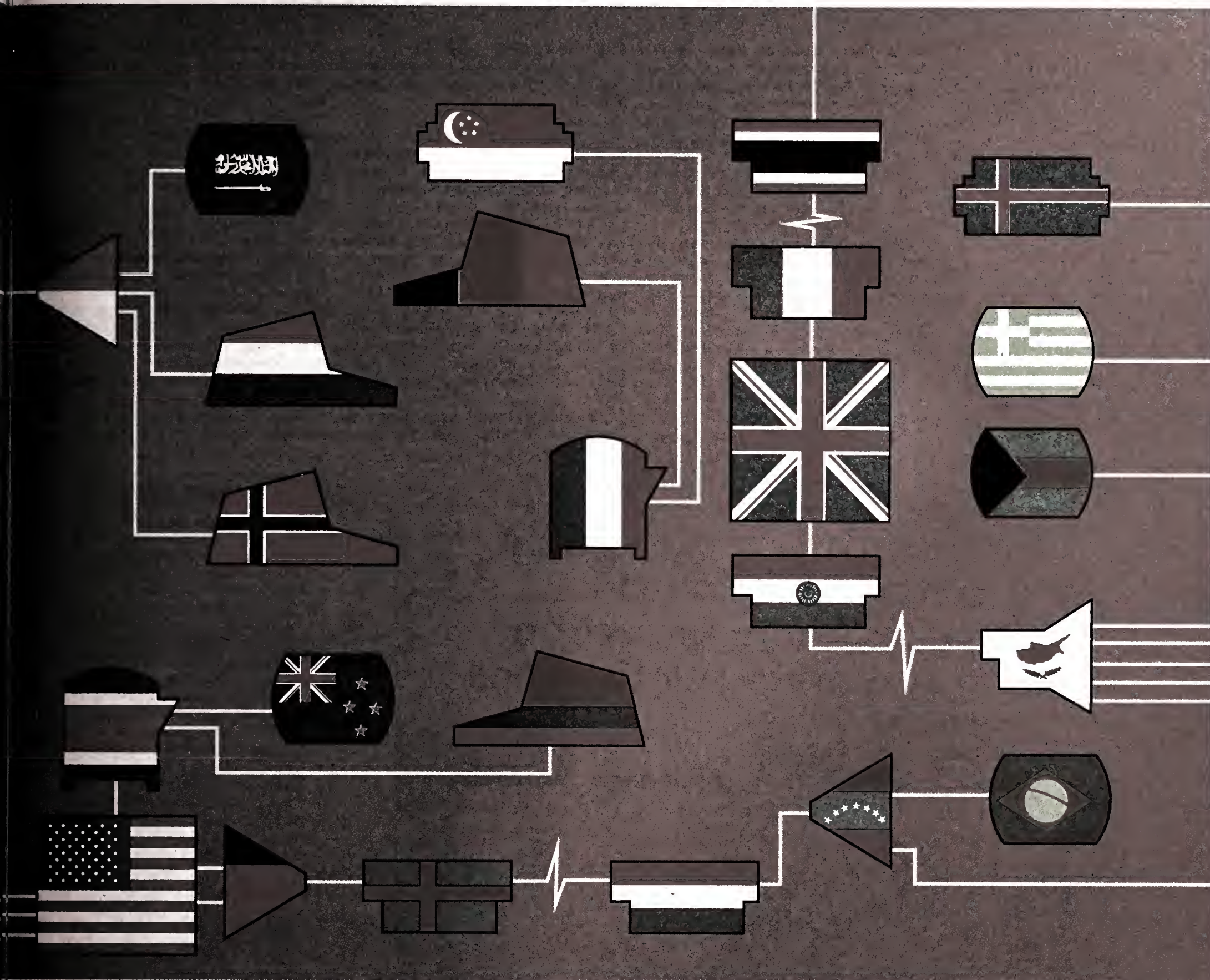
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MICROCOMPUTERS

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DQ132 ½-in. tape coupler and software for interfacing all popular ½-in. streaming and start/stop tape drives with densities up to 6,250 bit/in.; the Micro TK MV342, which includes a Dilog DQ342 coupler and software for interfacing Control Data Corp. Sentinel cartridge tape drives; the Micro SMD MV210, offering a Dilog DQ210 disk controller and software; and the Micro 506 MV610, which includes a Dilog DQ610 controller and coupler with software.

Prices are as follows: \$1,100 for the Micro Tape MV132 controller; \$990 for the Micro TK MV342 controller; \$1,270 for the Micro SMD MV210 controller; and \$1,345 for the Micro 506 MV610 controller, the vendor said.

Dilog, P.O. Box 6270, 1555 S. Sinclair, Anaheim, Calif. 92806.

■ **Computer Products International, Inc. has introduced networking capacity to its line of Universal mass storage systems.**

The systems, which range from 10M to 368M bytes, reportedly feature full multiplexing and networking capability that includes compatibility with Ethernet, IBM's PC Network and Datapoint Corp.'s Arcnet, among other networks.

The systems may be accessed by users of several different brands of computers running on a network, Computer Products said. The units are said to be compatible with the Apple Computer, Inc. Apple II, Apple IIe, Macintosh and Lisa; the IBM Personal Computer line; the Kaypro Corp. Kaypro IV; the Digital Equipment Corp. Rainbow 100 and 100 Plus; and others.

They are priced ranging from

\$1,995 to \$13,500.

Computer Products International, 740 S. Hillview, Milpitas, Calif. 95035.

■ **Viasyn Corp., formerly known as Compupro, has released a mass storage option for its System 816 microcomputers.**

The Tri-Disk Subsystem offers combinations of two 8-in. floppy drives, two 5¼-in. floppy drives or one each of 8-in. and 5¼-in. floppy drives — all with a choice of a 20M- or 40M-byte hard disk drive.

The floppy drives are double-sided, double-density with storage capacities of 1.2M bytes on the 8-in. drive and 800K-bytes on the 5¼-in. drive.

The subsystem is packaged in the standard Compupro disk enclosure

and includes the company's Disk 3 Direct Memory Access disk controller and Digital Research, Inc.'s CP/M 80 and CP/M 86 operating systems.

Prices are \$4,995 for the subsystem with a 20M-byte hard disk and \$5,495 for the subsystem with a 40M-byte hard disk.

Viasyn, 3506 Breakwater Court, Hayward, Calif. 94545.

■ **Alloy Computer Products, Inc. has announced enhancements to its line of integrated storage subsystems, hard disks, tape backup units and multiuser products to achieve full compatibility with IBM's Personal Computer AT.**

The enhancements to PC Qicstor and Qicstor-Plus, according to the vendor, are designed to increase the storage capacity and tape backup ca-

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To understand why, consider the Personal Computer's history. Introduced in 1981, the Personal Computer was then a pretty impressive piece of equipment, particularly for its 16-bit microprocessor and memory expansion capability. The Personal Computer, moreover, was never offered as a product for both the home and office; it was an office machine, pure and simple. That clarity of position told buyers that here was a machine that was no toy, here was a computer on which they could expect to conduct business.

It was also a statement to software developers, such as Lotus Development Corp., the developers of 1-2-3.

Now about the Macintosh. There is no doubt the machine is revolutionary, particularly for its use of bit-mapped graphics, pull-down menus and, oh yes, the rodent-on-a-wire. But, on its arrival, Macintosh was aimed at the home market, where Apple's sales have always been strongest. As the above list suggests, its homeyness shows.

Had the Macintosh been targeted to the corporate user, it might have come with a more extensive keyboard, a word processing package capable of producing documents of 15 pages and larger and either a color monitor or, at least, an expansion slot for a color card. Most importantly, software developers would have taken notice and begun the development of business applications to take advantage of the Macintosh.

Instead, the Macintosh to date has a number of nice art-graphics packages, a slew of education and home-finance packages — and the promise of Jazz from Lotus.

Whether or not Apple can move out the back door of the home and into the office, even with Macintosh Office leading the charge, one thing is certain. Apple's charge is a much-belated one — and all of its video slights against IBM cannot change that.



"That's a coincidence. We both have slipped discs."

MICROCOMPUTERS

pabilities the Personal Computer AT requires to operate optimally as a multiuser machine. PC Qicstor reportedly includes a hard disk — 20M bytes to 170M bytes — and a streaming cartridge tape backup unit with a file-oriented, formatted capacity of more than 50M bytes.

Qicstor-Plus is a high-capacity subsystem for IBM Personal Computers said to integrate in one cabinet five Personal Computer expansion slots, a hard disk drive and a file-oriented ¼-in. streaming tape.

Prices for PC Qicstor range from \$4,995 for the 20M-byte version to \$11,295 for a 120M-byte version. Prices for Qicstor-Plus range from \$5,595 for a 20M-byte version to \$10,595 for a 120M-byte version.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

■ **Innovative Data Technology, Inc.** has announced four hard disk systems for the IBM Personal Computer AT.

The 5¼-in. drives can be installed in the AT by connecting two cables to the AT's disk controller card, Innovative Data Technology said. According to the vendor, the drives include software that allows the user to select an appropriate drive, format the disk, certify operations, partition the drive and exit to the operating system.

The drives feature a 5M byte/sec data transfer rate and automatic thermal compensation for track stability.

The drives range in cost from \$3,000 to \$8,000.

Innovative Data Technology, P. O. Box 178160, 4060 Morena Blvd., San Diego, Calif. 92117.

■ **OSM Computer Corp.** has announced the Zeus Streaming Tape Backup (STB)-20, a 20M-byte streaming tape drive designed for backup and retrieval of data.

According to a spokesman, the product is designed for use with data being processed on the company's Zeus 4B multiuser business computer systems.

The Zeus 4B reportedly handles from two to four users and provides each user with a dedicated CPU, 64K bytes of random-access memory and I/O ports.

The Zeus STB-20 streaming tape drive executes data backup at 90 in./sec with standard ¼-in., four-track serpentine tape. The Zeus STB-20 weighs 11 lb, and the product is priced at \$1,995.

OSM Computer, 665 Clyde Ave., Mountain View, Calif. 94043.

■ **PC's Limited** has announced a 117M-byte internal hard drive for the IBM Personal Computer AT.

The disk drive contains 117M bytes of formatted storage and 140M bytes of unformatted storage, drops into the AT and works off the existing controller and power supply. The drive has an average access time of less than 30 msec, the company said. Half-height, streaming tape backup units are said to be available. Cost of the product is \$3,395.

PC's Limited, Suite E-200, 7901 N. Lamar, Austin, Texas, 78752.

■ **Syntactics, Inc.** has introduced Pulse Junior, a streaming tape backup utility software system designed for Archive Corp. ¼-in. streaming tape drives running with

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rectory, Dougherty calls up the to-do list throughout the day. "In the morning I give myself a printout of the to-do list including appointments," he said. "I can make myself a copy of my schedule with notes attached to it and print out a copy for my secretary." Later in the day, items from the to-do list that need further attention go into the tickler module.

Like Dougherty, Rodney Hildenbrand, product division manager with Robert Bailey Design Group in Portland, Ore., tracks customers and projects with Higgins. "It keeps me very honest," he said. "Nothing slips through the cracks."

Among other features, the built-in clock is "really great" for keeping on schedule, Case said. However, neither she nor Dougherty bother with the on-screen calculator or the expense report generator, although Hildenbrand uses both.

Dougherty uses the Higgins note writer for most word processing applications but said that the package is not suitable for documents more than two typewritten pages long.

Although the users contacted by *Computerworld* lacked modems, they all expect to get the equipment in the future, and they predicted that Higgins' autodialing functions will then save them time.

In addition, they all pointed to the advantages of the package's key-word retrieval feature and emphasized the ease of switching from Higgins to other PC-DOS applications.

The package also drew favorable reviews for ease of learning and ease of use. Each user said he had run Higgins for several months without reading the documentation.

"Higgins is the kind of program that I've been looking for since I first got a computer two years ago," Dougherty summed up.

Conetic, whose marketing

group for Higgins is based in San Leandro, Calif., began shipping a \$395 single-user version in December. Local-

area network versions also are available, primarily through resellers, the vendor said.

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*Industry report refers to IDC Industry Report

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the IBM Personal Computer and compatibles.

The software, which is downloaded from the micro's hard disk, reportedly will perform a full-image backup of a 10M-byte hard disk in just over three minutes.

Pulse Junior costs \$69.95.

Syntactics, 100 Pennsylvania Ave., Framingham, Mass. 01701.

■ **Wow Enterprises has introduced its Fixed Disk Upgrade Package for the IBM Personal Computer XT and XT/370.**

The Fixed Disk Upgrade Package reportedly increases the amount of fixed-disk storage in either machine to 20M bytes without the use of an external expansion unit. Instead, the computer's diskette drive is replaced

by a half-height, 10M-byte hard disk and a dual-sided diskette drive, the vendor said. The upgrade is designed for large amounts of storage.

The computer's 10M-byte hard disk is left in place and works in conjunction with the new disk without modification of the XT's original controller card, Wow Enterprises said.

The upgrade package costs \$784.

Wow Enterprises, 1500 Middlefield Road, Palo Alto, Calif. 94301.

■ **Aquix Advanced Systems Corp. has introduced the AQMS 188, a mass storage system for networked IBM Personal Computers.**

The AQMS 188 reportedly includes a 188M-byte, 8-in. Winchester drive, a ½-in. streaming tape backup unit and software. The AQMS 188 can be used as a file server in networked ap-

plications and allows users to have a start-up system when installing a local-area network, the vendor said.

The product reportedly operates on the same software partitioning and security as the firm's AQMS 513 and is compatible with IBM Personal Computers in a local-area network.

AQMS 188 is priced at \$18,450.

Aquix Advanced Systems, 140 Adams Blvd., Farmingdale, N.Y. 11735.

■ **Data Technology Corp.'s Teammate division has introduced a 3.3M-byte flexible subsystem for the IBM Personal Computer AT.**

The Teammate 1103 subsystem reportedly offers double the capacity of the Personal Computer AT's 1.2M-byte drive and can read standard IBM 96 and 48 track/in. diskettes. The AT's 1.2M-byte drive reportedly

does not write to the IBM Personal Computer's 48 track/in. diskettes.

The Teammate 1103 with a backup storage utility sells for \$945.

Data Technology, 2775 Northwestern Pkwy., Santa Clara, Calif. 95051.

PRINTERS/PLOTTERS/PERIPHERALS

■ **Sakata U.S.A. Corp. announced its SP-1000 dot matrix printer.**

The SP-1000 reportedly offers nine-by-11-dot printing with 12 variations for character printing within the same line. The SP-1000 accepts fanfold, single-sheet and roll paper.

The 80-col. printer is said to be equipped with a Centronics Data Computer Corp.-type parallel interface and to include an adjustable tractor feed unit. The printer's speed is 100 char./sec, and bidirectional printing is offered in text mode.

The SP-1000 is priced at \$349.

Sakata U.S.A., 651 Bonnie Lane, Elk Grove Village, Ill. 60007.

■ **Epson America, Inc. has introduced a thermal transfer printer for its Geneva portable computer and a dot matrix printer, the LX-80.**

The P-80 thermal transfer printer reportedly is the size of a typewriter roller and prints on both thermal and standard bond paper at 45 char./sec in a variety of type styles.

The LX-80 printer is said to feature both draft- and letter-quality dot matrix printing. It reportedly offers such print styles as compress, italic, elite or double strike.

The P-80 costs \$249. The LX-80 is priced at \$349.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505.

■ **NEC Information Systems, Inc. has introduced its Spinwriter Elf, a letter-quality printer for the IBM PCjr, the Apple Computer, Inc. Apple II series and other personal computers.**

The Spinwriter Elf reportedly prints up to 190 word/min. and offers pitch selections of 10, 12, 15 and proportional pitch. It also can provide bold and shadow print, bidirectional print capability and autoloading, the vendor said. A cut-sheet guide is said to be included.

The Spinwriter Elf also reportedly offers built-in command code and interface selectability and is supported by such software as Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar.

Spinwriter Elf is priced at \$545.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

■ **C. Itoh Digital Products, Inc. has announced a 29 char./sec version of its Starwriter series Model A10 daisywheel computer output printer.**

According to a spokesman, the Starwriter A10-30 is designed to enable micro users to print letter-quality, finished manuscripts and formal documents at 29 char./sec.

The system is said to work with IBM Personal Computers. It features a 138-char. column width for wide paper, 200-byte (or optional 2K- to 8K-byte maximum) buffer memory for bidirectional printing and RS-232C serial or Centronics Data Com-

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puter Corp.-type parallel communications interfaces.

The printer offers friction and optional bidirectional tractor paper feed, the vendor said. Logic-seeking bidirectional printing reportedly eliminates the need for carriage return at the end of each line, and the 100-char. set provides all letters, numbers and punctuation needed for business correspondence.

The Starwriter A10-30 costs \$825. C. Itoh Digital Products, Suite 220, 19750 South Vermont Ave., Torrance, Calif. 90502.

■ **Fujitsu America, Inc. has announced Dotmax 24, a 24-wire dot matrix color printer.**

The product allows users to print charts, bar graphs, line graphs and text in eight colors, Fujitsu said. A four-color ribbon reportedly features red, yellow, blue and black printing on a single pass and green, orange, purple and brown on a second pass.

The printer is said to produce 360 dot/in. by 180 dot/in. resolution in text mode and 180 dot/in. by 180 dot/in. in graphics resolution.

It prints letter-quality output at a speed of 80 char./sec and draft-quality documents at 240 char./sec, Fujitsu said. Dotmax 24 costs \$2,145.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

■ **Princeton Graphics Systems, Inc. has announced two terminals and an enhanced monitor.**

SR-12P is a color monitor for professional and scientific users who require high resolution and a wide range of colors, according to the vendor. The terminal is said to feature 690- by 480-pixel resolution and an antireflective coated panel that reduces glare and enhances color contrast, the vendor said. The monitor reportedly displays up to 4,096 colors and is compatible with the IBM Professional Graphics card.

HX-9E, a 9-in. color monitor, operates on dual-scan frequencies and offers 640- by 200-pixel resolution in graphics mode and 640- by 350-pixel resolution in text mode, Princeton said. The monitor reportedly displays 2,000 characters on 80 columns in 25 lines. HX-12E, a 12-in. color monitor, is said to provide 690- by 240-pixel resolution in graphics mode and 690- by 350-pixel resolution in text mode. It displays 2,000 characters on 80 columns in 25 lines.

All three monitors work with the IBM Personal Computer, and the HX-9E can be used with Apple Computer, Inc.'s Apple IIe microcomputers.

SR-12P is priced at \$999, HX-9E costs \$650 and HX-12E sells for \$785.

Princeton Graphics Systems, 170 Wall St., Princeton, N.J. 08540.

■ **Sumicom, Inc. has announced its 2120 Color Monitor, a 12-in. terminal that can be used with the IBM Personal Computer or Apple Computer, Inc.'s Apple II line of microcomputers.**

The monitor reportedly supplies 640- by 200-pixel resolution. A user can choose from either 16 standard or eight user-defined colors, the vendor said.

The terminal is designed for business, scientific and educational applications, according to Sumicom. The 2120 Color Monitor is said to

supply an 80-col. by 25-line format that displays up to 2,000 characters. Front panel controls include adjustments for contrast, brightness and horizontal and vertical hold, the vendor said.

The 2120 Color Monitor costs \$499.

Sumicom, 17862 E. 17th St., Tucson, Calif. 92860.

■ **NEC Information Systems, Inc. has announced a four-color pen plotter that is compatible with Hewlett-Packard Co.'s 7470 graphics plotter.**

The Britewriter four-color pen plotter is available with felt-tip pens in black, blue, green and red. An optional set of four colors — violet, orange, brown and pink — is also available.

Pens can be changed without interrupting the job, the vendor said.

The Britewriter reportedly can deliver full-color printing directly onto transparencies.

It is said to operate at 60mm/sec in low-speed mode and up to 112mm/sec in high-speed mode. Plotting speed is 4.6 char./sec in monochrome and 2.6 char./sec in four colors.

Plotting direction is along the horizontal axis, with 0.1mm accuracy in both horizontal and vertical directions, according to the vendor.

Other features are said to include 256 bytes of character and instruction storage in memory, Ascii character code and serial or parallel interfaces.

The plotter is said to be compatible with a variety of software packages, including Lotus Development Corp.'s 1-2-3 and Symphony. The Britewriter

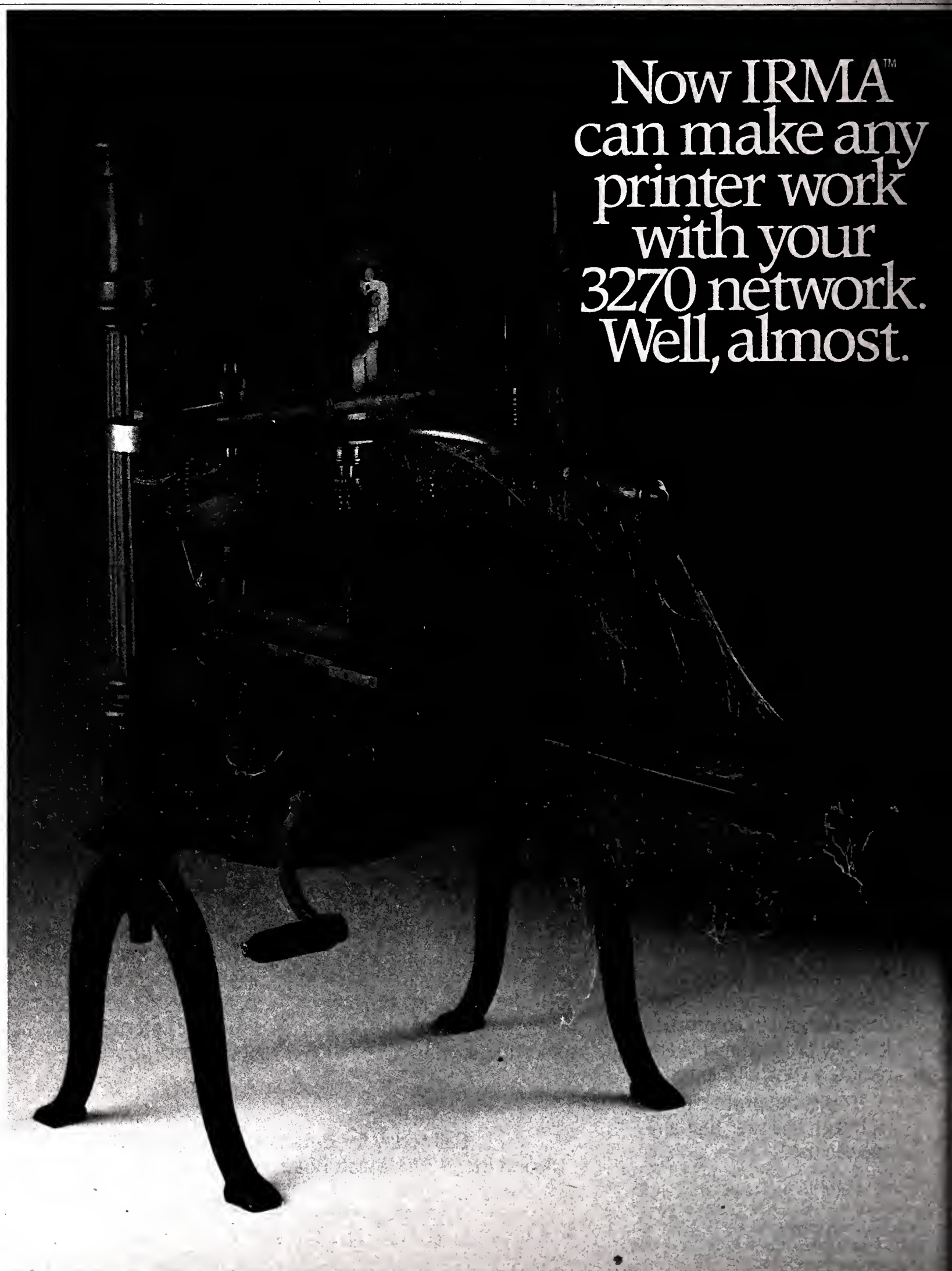
is scheduled for delivery in January 1985 and will be priced at approximately \$599.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

BOARD-LEVEL DEVICES

■ **Star Gate Technologies has introduced Octacom, an expansion board with multiple serial ports for the IBM Personal Computer line.**

The board provides four to eight ports and fits in any full-length expansion slot on a Personal Computer, the vendor said. The product allows microcomputers to tie into modem lines, monitor security systems and communicate with mainframes, ac-



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MICROCOMPUTERS

cording to Star Gate.

Octacom features reportedly include an address decoder and interrupted circuitry, contained in programmable devices for custom configuration.

A four-port module costs \$295, a six-port module sells for \$345 and an eight-channel module is priced at \$395.

Star Gate Technologies, P.O. Box 764, Cleveland, Ohio 44026.

■ **Computer Development Services, Inc.** has introduced Power Drive, a high-speed printer interface to the IBM Personal Computer.

Power Drive plugs into one of the Personal Computer's expansion slots and supports printers at speeds up to 800 line/min without requiring user program modification, according to

the vendor.

Power Drive requires a Centronics Data Computer Corp.- or Dataproducts Corp.-compatible high-speed printer and comes with an interface board for use in the Personal Computer.

It is priced at \$1,085, according to the vendor.

Computer Development Services, 1851 Dana St., Glendale, Calif. 91201.

■ **North Star Computers, Inc.** has announced that its multiuser Dimension line of IBM Personal Computer-compatible computers now supports the Intel Corp. 8087-2 coprocessor.

The Dimension line, which supports up to 12 users, features an Intel 8088-2 microprocessor operating at a

speed of 8 MHz.

The 8087-2 coprocessor, designed to support floating-point arithmetic, can increase a Dimension system's processing speed by as much as 500%, the vendor said.

An 8087 processor board costs \$550.

North Star Computers, 14440 Catalina St., San Leandro, Calif. 94577.

■ **Teletex** has announced Teletex Z-150MB, a multifunction memory board for Zenith Data Systems Corp. Z-150 and Z-160 microcomputers.

The board is said to provide up to 384K bytes of random-access memory (RAM). The Z-150MB's real-time clock features battery backup and accurately keeps time for up to two years, Teletex said.

The package reportedly includes Timesavers, a software program that includes a RAM drive program.

Teletex Z-150MB costs \$199.

Teletex, 4600 Pell Drive, Sacramento, Calif. 95838.

■ **Bronson Electronics Corp.** has announced Innovation 1007A, an expansion board for the IBM Personal Computer AT.

The Innovation 1007A consists of a parallel printer port, IBM light pen accessory connector and socketed random-access memory and read-only memory to accept alternate character fonts, the vendor said.

The board reportedly provides color, graphics and printing capabilities.

The product supports red-green-blue and monochrome composite monitors as well as television sets with a radio frequency modulator, Bronson said.

Innovation 1007A costs \$244 with a printer port and \$225 without the port.

Bronson Electronics, 12700 Nicollet Ave. S., Burnsville, Minn. 55337.

■ **Chorus Data Systems, Inc.** has introduced its Screenmaster, a half-width expansion board that reportedly provides 16 true shades of gray for the IBM Personal Computer color monitor.

Users reportedly can switch their color monitor (IBM Model 5153 or equivalent) between color operation and monochrome mode manually or under program control. Screenmaster reportedly gives black-and-white display of text or continuous tone pictures.

When used in conjunction with a Tecmar, Inc. Graphics Master board and Chorus's PC-Eye and Photobase software, Screenmaster reportedly allows users to extend data base management systems such as Ashton-Tate's Dbase II to include cross-indexed photo albums.

Screenmaster is priced at \$195.

Chorus Data Systems, Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

■ **Zendex Corp.** has introduced its ZX-186/30 single-board computer and its ZX-940, a configurable desktop Intel Corp. Multibus system chassis.

The ZX-186/30 reportedly offers up to 1M byte of random-access memory (RAM), one RS-232C serial port, a Centronics Data Corp.-type parallel port and one RS-422/449 or RS-232C port for high-speed data communications. It also is said to offer four 28-pin programmable read-only memory sockets, a disk interface and two auxiliary RS-232C serial ports.

The ZX-940 chassis reportedly offers two 5¼-in., half-height disk drive positions, a full-height disk drive position, four Multibus card slots and a 250W switching power supply. The unit has a 16½-in. wide by 17-in. deep footprint when used with a terminal atop its chassis, Zendex said.

The ZX-940 is priced at \$1,595. The ZX-186/30 is priced from \$2,195 to \$3,395. A \$1,495 expansion board is available to upgrade the ZX-186/30 from 512K bytes to 1M byte of RAM.

Zendex, 6700 Sierra Lane, Dublin, Calif. 94568.

See BOARD page 110



IRMA introduces IRMAprint.

When you set up an IBM® 3270 network, you're faced with the fact that you can't just go out and buy any printer to work with it.

Your choices are, to say the least, limited. Even IBM only makes a few that are compatible.

But with new IRMAprint from DCA, the limits are off.

IRMAprint isn't a printer. It's a printer emulator. In technical terms, it hoodwinks the IBM mainframe into thinking that whatever printer attached to it is a 3287.

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For more information about IRMAprint, or any of the IRMA family of IBM-emulation products, send in the coupon below. Faster still, call 1-800-241-IRMA. Telex 261375 DCAATL.

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Name _____

Firm _____ Title _____

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MP-02-08

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MICROCOMPUTERS

BOARD from page 109

■ **Chorus Data Systems, Inc.** has introduced its PC-1200 video digitizer board for the IBM Personal Computer line.

The PC-1200 reportedly stores images directly to main memory or the graphics adapter's memory and can use a video camera or video recorder to record 640- by 512-pixel by 8-bit images.

The PC-1200 includes menu software for users to capture, store and print an image, Chorus said. Subroutine libraries supporting C, assembler and Basic languages also are included.

The PC-1200 is priced at \$1,495.

Chorus Data Systems, P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

■ **AST Research, Inc.** has introduced Ramstak, a series of expansion boards that provides up to 2M bytes of random-access memory (RAM) for Apple Computer, Inc.'s Lisa.

The product fits into a Lisa expansion board slot and comes in 512K-byte, 1M-byte, 1.5M-byte and 2M-byte models, according to the vendor. The product is designed to allow users to take advantage of the Lisa's RAM expansion capabilities and to support multiuser operating systems like AT&T's Unix and Microsoft Corp.'s Xenix, AST Research said.

A 512K-byte board costs \$1,395, and each additional 512K bytes sells for \$1,000.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

■ **Sigma Designs, Inc.** has introduced its Color 400 high-resolution color/graphics board for the IBM Personal Computer.

The Color 400 board reportedly offers 640 dots by 400 lines of point-addressable graphics in noninterlaced mode and also runs existing software written for 200-line cards.

It is said to be compatible with the Sigma Design CM12 and the Princeton Graphic Systems SR-12 monitors.

The Color 400 board also reportedly offers 16 colors and is compatible with 40-char.-by-25-line and 80-char.-by-25-line alphanumeric modes.

The Color 400 board is priced at \$795.

Sigma Designs, 2023 O'Tolle Ave., San Jose, Calif. 95131.

■ **Charles River Data Systems, Inc.** has announced two memory boards designed to give its Universe super-microcomputer systems up to 10M bytes of total memory.

The 2M-byte and 4M-byte boards are intended to provide added memory capacities for applications such as scientific computing, computer-aided design and computer-aided manufacturing and image processing.

The company said the memory boards allow configuration flexibility under which a four-user Universe system with 512K bytes of memory and 35M bytes of disk storage can be expanded to a 64-user system with 10M bytes of memory and 1.6G bytes of disk storage.

The 2M-byte memory board costs \$8,000, and the 4M-byte memory board costs \$15,000, according to the

vendor.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 01701.

■ **Advanced Digital Corp.** has released an 8-MHz, 16-bit, single-board processor for adding users to an IBM Personal Computer or compatible machine.

The processor contains an Intel Corp. 8088 CPU, 256K bytes of random-access memory, a personal computer bus interface and two serial ports.

The user plugs the PC-Slave/16 into the personal computer bus and adds a dumb terminal to get the capability of an additional personal computer, according to a vendor spokesman. Disks and peripherals are reportedly shared.

Advanced Digital's RTNX Executive software is required to run two or more users, the vendor spokesman said.

For installations requiring many users, Advanced Digital's PC-Exbus expansion chassis can accommodate up to 12 PC-Slave/16 processor boards, according to the spokesman.

The PC-Slave/16 processor board is priced at \$1,095.

Advanced Digital, 5432 Production Drive, Huntington Beach, Calif. 92649.

■ **Sanyo Business Systems Corp.** has introduced a video expansion board for its MBC 550 series microcomputer said to allow the microcomputer to run Lotus Development Corp.'s 1-2-3, Software Publishing Corp.'s PFS series and other

IBM Personal Computer applications.

According to the vendor, the MBC 555-2 video board will allow additional video functions for the MBC 550. The board operates as an IBM color video board, the vendor said, allowing the user to utilize IBM software that directly accesses the IBM video memory.

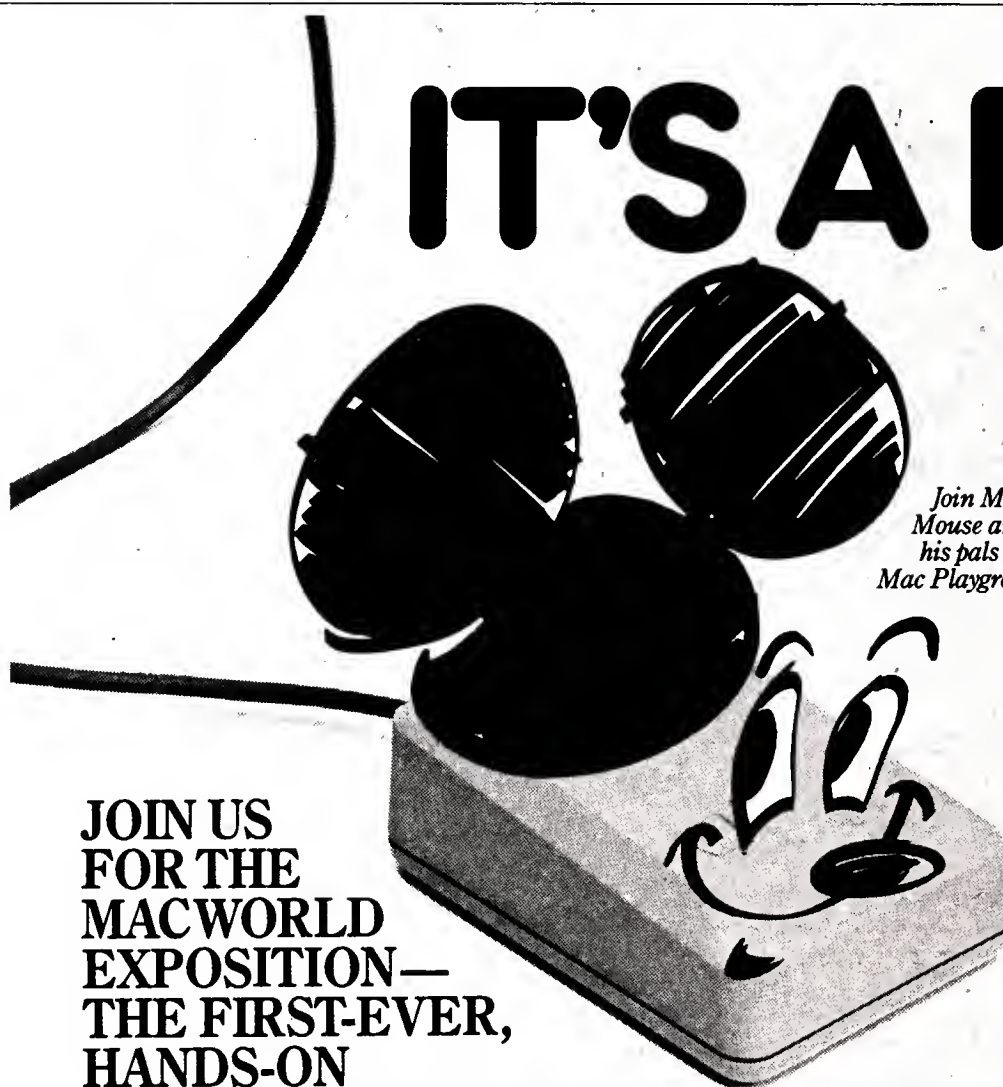
The vendor's original video mode will continue to operate when the video board is installed, the vendor said.

Using the IBM mode, there are reportedly 16-color graphics capabilities with 320- by 200-pixel resolution or 640- by 200-pixel monochrome display.

The video board sells for \$199, the vendor said.

Sanyo Business Systems, 51 Joseph St., Moonachie, N.J. 07074.

IT'S A PARTY

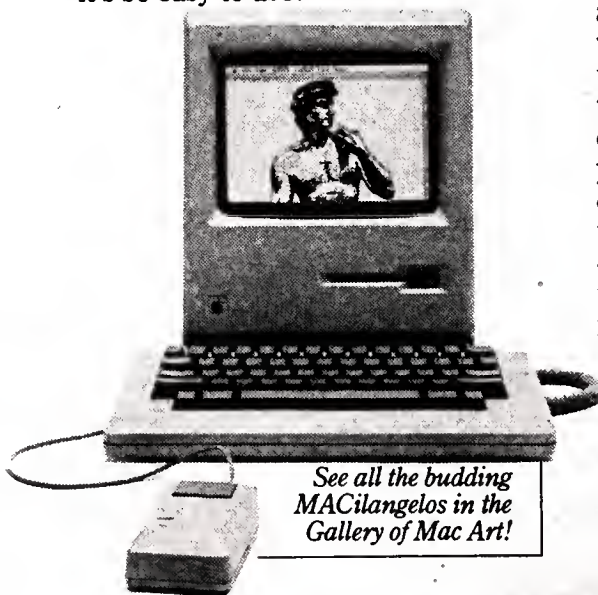


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DAYS TWO & THREE ARE FOR THE REST OF US! Friday and Saturday, February 22 & 23, is when the real fun begins! The whole world is invited to come play, watch, learn,

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ANYONE WHO'S ANYONE WILL BE HERE!

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MICROCOMPUTERS

■ **Princeton Graphic Systems, Inc.** has announced Colorview, a color graphics board for the IBM Personal Computer.

Colorview is plug-compatible with the IBM Color Graphics Adapter and provides 32K bytes of random-access memory rather than the 16K bytes that the IBM board offers, the vendor said.

The board is said to provide background and foreground color from a range of 16 colors that are available in IBM high-resolution graphics mode.

The product supports a light pen and connection to a radio frequency modulator on a television, the vendor said.

The Colorview graphics board costs \$289.

Princeton Graphics Systems, 170 Wall St., Princeton, N.J. 08540.

■ **Mega Omega Systems, Inc.** has announced Omega Diskless Memory, a multifunction memory board designed for the IBM Personal Computer.

The board provides random-access memory of 896K bytes (expandable to 1M byte), supports an Intel Corp. 80186 coprocessor and has serial and parallel port capability, the vendor said.

The product reportedly features error checking, correction and logging capabilities.

Omega Diskless Memory is said to provide its users with battery back-up capability.

The Omega Diskless Memory board costs \$1,695, according to the vendor.

Mega Omega Systems, Suite 108, 5477 Glen Lakes Drive, Dallas, Texas 75231.

■ **Advanced Logic Systems, Inc.** has announced a version of its CP/M Card that allows Digital Research, Inc. CP/M and Apple Computer, Inc. ProDOS files to share a hard disk.

The CP/M Card adds the hardware and software necessary to operate CP/M 3.0 on Apple II, II+ and IIe computers.

ProDOS remains intact when CP/M 3.0 is loaded, and the CP/M system, including programs and data, is contained in a single file on the disk, the vendor said. The CP/M file, operating on top of ProDOS, can be any size the user requires up to the maximum 10M bytes.

This reportedly enables the user to take advantage of software applications, including Micropro International Corp.'s Wordstar, Sorcim Corp.'s Supercalc and Ashton-Tate's

Dbase II.

The CP/M Card costs \$399. Advanced Logic Systems, 1195 E. Arques Ave., Sunnyvale, Calif. 94086.

■ **Omni Marketing Concepts, Inc.** has introduced Micro-Guard, Westford Systems' personal computer expansion board for providing security to the IBM Personal Computer, Personal Computer XT and Personal Computer AT.

Micro-Guard reportedly prevents unauthorized persons from accessing personal computer data.

It is said to provide audit tracking, productivity measurement, tamper detection, a secure event log and a clock/calendar. Micro-Guard requires 128K bytes of memory, a full-size expansion slot and an 80-char. display.

It is priced at \$595. Omni Marketing Concepts, P.O. Box 613, Lindenhurst, N.Y. 11757.

■ **Action Computer Enterprise, Inc.** has released two expansion boards for its line of Discovery multiprocessor, multiuser microcomputers: DPC-88U and Discovery Concurrent PC Attachment.

DPC-88U features an Intel Corp. 8088 microprocessor, Digital Research, Inc.'s CP/M 86 and Concurrent DOS operating systems and 256K bytes of random-access memory, which can be expanded to 1M byte, the vendor said.

As many as 16 DPC-88Us can reportedly be integrated into a Discovery multiprocessor system. The DPC-88U is said to include onboard erasable programmable read-only memory with diagnostic routines to permit testing of memory array and the interprocessor communications channel.

A DPC-88U with 64K bytes of memory is priced at \$695. A 256K-byte version costs \$995, and a 1M-byte option costs approximately \$1,600.

Discovery Concurrent PC Attachment reportedly allows Action's DPC-186, DPC-816 or DPC-88U multiuser systems to run Digital Research's Concurrent DOS 3.1 operating system.

The product reportedly allows workstations on a local-area network to access a data base and other resources, such as printers and disk drives.

The system supports up to 16 users who can run Digital Research CP/M, Microsoft Corp. MS-DOS and IBM PC-DOS software, Action said.

The Discovery Concurrent PC Attachment consists of one part for the attached microcomputer and another part for the host processor.

Each microcomputer attachment is priced at \$350, and host attachments average \$105 per connection.

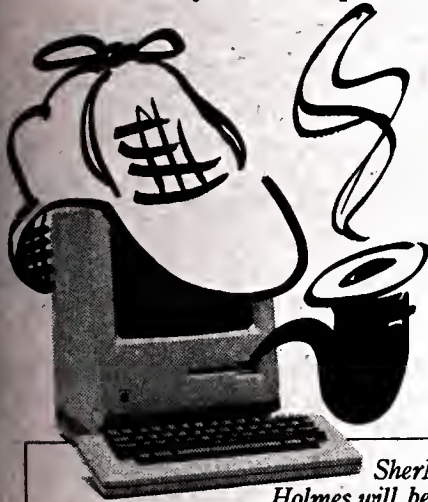
Action Computer Enterprise, 430 N. Halstead St., Pasadena, Calif. 91107.

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Here's our three-day conference schedule:

Thursday, February 21: Industry/Press Sessions

- 10:00 • Industry Forum: the Outlook for the Macintosh in the Office
- 11:30 • Industry Roundtable Discussions
- 12:00 • (lunch break)
- 1:00 • Industry Forum: Developing Software for the Mac—Opportunities and Pitfalls
- 2:30 • Industry Roundtable Discussions
- 3:00 • Industry Forum: the Outlook for the Macintosh in the Home and School
- 4:30 • Industry Roundtable Discussions
- 5:00

Friday, February 22: Business/General User Sessions

- 12:00 • Keynote Presentation: the Future of the Macintosh and What It Means for You
- 2:00 • How to Start and Survive in Business with Your Macintosh
- 3:00 • Maximizing MacPaint
- The Mac Clinic
- 3:00 • Interfacing the Mac with Other Apples
- 4:00 • A Guide to Better Business Graphics
- How to Create Useful Documentation
- 4:00 • What the Fat Mac Can Do
- 5:00 • Maximizing MacWrite
- Putting LANS to Work for You

Saturday, February 23: Education/General User Sessions

- 12:00 • The Macintosh in the Classroom
- 1:00 • All About MacBasic
- Unveiling the Mac's Hidden Features
- 1:00 • The Mac in Higher Education
- 2:00 • All About MacPascal
- How to Write User-Friendly Software
- 2:00 • Developing University Courseware with the Mac
- 3:00 • Data Base Management of the Mac
- How to Become a Wizard at Machine Language Programming
- 3:00 • Understanding the Power of Peripherals
- 4:00 • Getting the Most Out of Spreadsheet Programs
- File Management Tips and Techniques
- 4:00 • How to Get Your Programs Published
- 5:00 • What's Available in Mac Software
- Maximizing Mac's Disk Storage



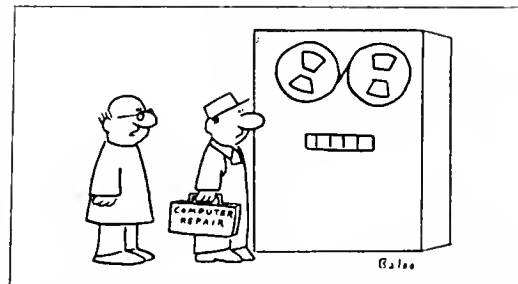
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MICROCOMPUTERS

AUXILIARY EQUIPMENT

■ **Adtech Power** has announced **Model 4KS 150 IBM**, a power supply for the IBM Personal Computer and Personal Computer XT.

The power supply provides 150W of power, compared with the IBM Personal Computer's 63.5W of power and the Personal Computer XT's 130W of power, the vendor said. The product also reportedly is equipped with four sources of output.

Model 4KS 150 IBM costs \$210.

Adtech Power, 1620 S. Sunkist St., Anaheim, Calif. 92806.

■ **Innovative Electronics, Inc.** has announced the **AC-10 Uninterruptible Power Supply**, intended to keep power on a microcomputer system

when ac line voltage fails.

When line voltage drops or fails, the battery inverter is said to supply 200W-square ac current with peak voltages within 1.5 msec for at least 15 minutes of full load. In addition, the AC-10 is said to save typewriter memories when unplugged, operate security systems and run retail point-of-sale terminals during a blackout.

The price for the AC-10 is \$995, the vendor said.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

■ **Tech Sketch, Inc.** has introduced its **Micro Illustrator**, a light pen color graphics system for the IBM Personal Computer line.

Micro Illustrator's color software is said to offer the ability to store light pen pictures on diskette and to

print pictures in color or black-and-white.

The product is also said to offer a choice of 10 different brush strokes and 10 different drawing modes, including lines, rays, boxes, circles, color filing, free-hand drawing and others.

Micro Illustrator is priced at \$69.95.

Tech Sketch, 26 Just Road, Fairfield, N.J. 07006.

■ **Dayna Communications, Inc.** has introduced **MacCharlie**, a hardware add-on that enables the Apple Computer, Inc. Macintosh to run software written for the IBM Personal Computer.

MacCharlie reportedly permits Macintosh users to connect to serial networks for the Personal Computer

and to use Personal Computer-compatible printers. MacCharlie is said to function as a coprocessor and is connected to the Macintosh via a cable, also included.

Under MacCharlie, the Macintosh is reportedly able to behave as either a Macintosh or a Personal Computer. Several Macintosh features, such as its desktop utilities and clipboard, will work with MacCharlie while in the Personal Computer mode, the vendor said.

MacCharlie costs \$995.

Dayna Communications, 50 S. Main St., Suite 530, Salt Lake City, Utah 84144.

■ **Cyborg Corp.** has introduced **Isaac 41-I** and **Isaac 91-I**, packages that allow scientists and engineers to use an IBM Personal Computer for data acquisition and control.

The packages are designed to automate analytical instruments and industrial processes such as temperature monitoring and control, vibration measurements and physiological testing, Cyborg said.

The Isaac 91-I, a general-purpose computer interface for workstation applications, is said to include an IBM Personal Computer interface, 16 channels of 12-bit analog-to-digital conversion, four channels of 12-bit digital-to-analog conversion, 16 binary I/O channels, four programmable Schmitt triggers, a 16-bit timer and eight expansion slots.

The Isaac 41-I, a building block for applications, features an IBM Personal Computer interface, four expansion slots and the ability to accept 256 low-level inputs, Cyborg said.

The Isaac 91-I is priced at \$1,900, and the Isaac 41-I costs \$4,400.

Cyborg, 55 Chapel St., Newton, Mass. 02158.

■ **Bits Power Systems, Inc.** has announced two on-line uninterruptible power systems (UPS) for microcomputers, with a multicolor bar graph display indicating either output power or battery level.

A six-digit LED clock indicates correct time during normal operation and automatically becomes a backup timer if utility power fails, the company said. When utility power is restored, the correct time is said to be displayed automatically. Audible and visual alarms also are standard.

Unlimited backup time is possible by attaching the appropriate batteries to the expansion jack on the system, the company said. The standard, internal, sealed lead-acid batteries are said to provide a minimum backup of 10 minutes. Model UPS-310 is housed in an IBM Personal Computer-type enclosure, and Model UPS-700 is said to be suitable for larger systems.

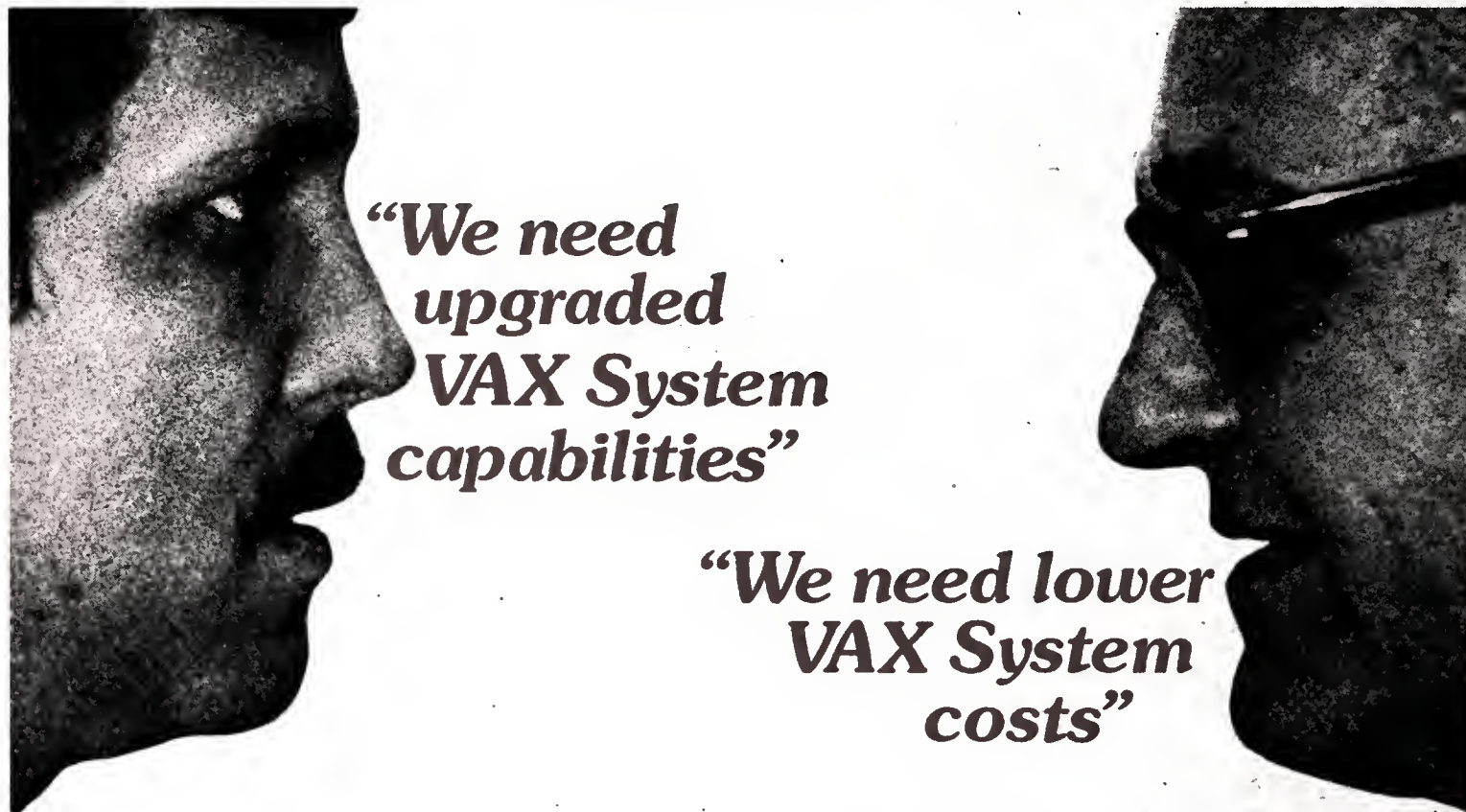
The price of the UPS-310 is \$895, and cost of the UPS-700 is \$1,240.

Bits Power Systems, Suite B114, 11020 Audelia Road, Dallas, Texas 75243.

■ **Chorus Data Systems** has announced **Imigit**, an image creator and picture creator with video digitizer support for the IBM Personal Computer.

Imigit is capable of capturing and editing high-resolution (up to 640- by 512-pixel) images from a standard camera or videocassette recorder, Chorus Data Systems said.

Continued on page 116



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MICROCOMPUTERS

Continued from page 112

Graphics from packages such as Lotus Development Corp.'s 1-2-3 reportedly can be enhanced with features such as multifont annotation, texturing, color fill and integration of photographs, drawings, logos or scenery.

Imigit's PC-EYE board connects to an EIA RS-170 or RS-343 video source and converts the video signal into digital format, according to Chorus. Images captured by PC-EYE can be displayed and edited by Imigit.

Imigit costs \$695.

Chorus Data Systems, P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

■ **Para Systems, Inc.** has announced the Minuteman 500 Uninterruptible Power Supply, said to provide 500W backup power to prevent loss of data during blackouts and brownouts for up to 30 minutes.

The Minuteman 500 is intended to protect all microcomputer systems and word processors. Features include internal, sealed, maintenance-free batteries; two alarm systems and three light indicators for notification of system inverter and battery status; audible alarm disable switch; low-voltage battery cutoff for battery protection; and three grounded National Electrical Manufacturers Association 5-15R receptacles to provide multiple unit protection.

The price of the Minuteman 500 is \$699.

Para Systems, Suite 404, 11425 Mathis St., Dallas, Texas 75234.

■ **Sun Research, Inc.** has announced four power supply systems for microcomputers and minicomputers: the SR3, SR6, SR30 and SR60.

SR3 provides blackout protection and filters ac power, according to the vendor.

The product reportedly is a 300W backup system with a built-in, maintenance-free battery that gives users 15 minutes to close down their system before data is lost.

SR6 supplies 600W of power and features an ac current meter that allows the operator to keep track of current draw and prevents overloading of the system, Sun said.

SR30 reportedly provides

120 volts of 60Hz sine-wave power.

It is said to feature an LED that indicates the battery's condition and an alarm that warns the user when battery power is low.

SR60 provides protection from blackout, brownout, sag, spike and surge on an ac circuit, Sun said. It provides up to 15 minutes of 600W power.

Prices for the SR3, SR6, SR30 and SR60 systems are \$695, \$995, \$995 and \$1,495,

respectively.

Sun Research, Box 210, Old Bay Road, New Durham, N.H. 03855.

■ **Futurenet** has introduced a version of its Dash-1 schematic design system for the Texas Instruments, Inc. Professional microcomputer.

Dash-1 is said to include a graphics editor, a Futurenet RS-232 mouse and a complete set of part symbol libraries. The package reportedly con-

verts the Professional into a board-level and chip-level design tool.

Dash-1 is said to operate without interfering with the Professional's other applications.

The software's list of materials function is produced automatically, while its net list function can be used to aid circuit board layout and artwork preparation, Futurenet said.

Dash-1 for the TI Professional is priced at \$4,980, the

vendor said.

Futurenet, 6709 Independence Ave., Canoga Park, Calif. 91303.

■ **Kimtron Corp.** has announced a data display terminal designed for the IBM Personal Computer, XT, AT and compatibles.

The KT-7/PC reportedly provides 25 lines of display, Personal Computer look-alike character sets, video attributes and keyboard.

Takes their without



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MICROCOMPUTERS

The terminal also provides such features as tilt and swivel and height adjustment of the monitor, a serial printer port, optional amber screen and optional 14-in. screen, the vendor said.

It is also said to be able to emulate a standard Ascii terminal.

The KT-7/PC is priced at \$895.

Kimtron, 2225-I Martin Ave., Santa Clara, Calif. 95050.

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of a system, coding up worksheets with project data, turning it into keypunching and waiting for results. If they were lucky and made no mistakes, they would get back their project schedule. Obviously, only the biggest, most complex projects warranted this type of effort.

Mainframe-based project management systems have improved greatly with the addition of interactive capa-

bilities, report writers and graphics systems. But they still remain a long way from the simplicity and interactivity of personal computers.

Today, some personal-computer-based project management systems produce color Gantt charts and network diagrams, develop resource loading and even maintain cost information.

Much of the software provides this data in seconds and requires only hours to learn. Project management is

now being used by departments that have traditionally shied away from the mainframe tools that MIS and engineering have used.

Well, none of this sounds dangerous, but I do see two major reasons to fear this trend — credibility and corporate coordination.

Previously, project schedules were taken with a grain of salt. Everyone knew that the factors affecting the schedule were many and complex. Therefore, people

producing these schedules were more likely to provide them in a discussion than in formal project proposals with endless support documents and subschedules.

With today's personal computer tools, project schedules are being prepared more formally, and because they are generated on a computer, they are utilized with greater confidence.

However, the assumptions that go into these schedules are simplistic. What about general and administrative overhead time, cross-project utilization of common resources and vacations? Personal computer systems generally do not address these issues. If they did, they would no longer have the simplicity and interactivity that is demanded.

In short, a personal computer schedule is much better than no schedule at all, but an understanding of its limitations is vital. If this understanding is missing, credibility will disappear as quickly as project end dates pass.

Even more significant are the problems of corporate coordination and communications. But micro-based systems are, by nature, oriented toward ignoring the corporate view.

A company needs a way of seeing the big picture. This is where mainframe systems have excelled, because they have a hierarchical design.

No micro system can do this vital and sophisticated analysis — if it tried, it would quickly bog down under the mass of data.

Product diversity

Corporate communications are further hampered by the incredible diversity of products being utilized within a company. Not only is the engineering department using a different product than MIS, but even project managers within the same group are working with different tools. There is no way to get data from one product to the other short of reentering it, and, in many cases, terminology and philosophy differences make even manual transfer impossible.

Personal-computer-based systems are excellent for project setup, initial planning, simulations and other such tasks. Mainframe products work well for corporate collection of information, sophisticated resource availability scheduling and cross-project reporting and tracking.

Personal computer project management software must be designed to develop and schedule projects on the micros and then upload them to mainframe systems. This setup obtains the advantages of the mainframe while preserving the personal computer's interactivity, simplicity and graphics.

terminal's place the space.

It's important that the Displayphone-Plus* terminal can fit with an existing information management system, offering download emulation of virtually any cursor addressing conversational CRT and plug-and-play compatibility with the VT-100.

But what makes the Displayphone-Plus amazing is that it does it all while still fitting comfortably on a desk.

Inside the Displayphone-Plus terminal is a 212A compatible auto answer modem with selectable 300/1200 BPS transmission rates and full automatic log-on. So it can meet the needs of managers and other occasional data users, while emulating such terminals as the Digital Equipment Corporation

VT-100™ and VT-52™, ADDS Viewpoint®, Regent 25®, and many more.

On the outside is a full-stroke keyboard and easy-to-read amber screen which allows the Displayphone-Plus terminal to match the performance of large, conventional terminals. Its sophisticated telephone capabilities allow it to surpass them with a 90-number directory, automatic dialing, and handsfree speaking. And it's as easy as a telephone to use.

To find out more about the Displayphone-Plus terminal, call 1-800-328-8800, or write to Northern Telecom Inc., Advanced Communications Terminals Division, P.O. Box 202048, Dallas, TX 75220-9990.

nt northern
telecom

MICROCOMPUTERS

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■ **Chorus Data Systems, Inc.** has announced a converter said to change National Television Standard Code (NTSC) composite color signals into analog red-green-blue.

Colorverter can be used in conjunction with the vendor's PC-Eye Video Capture System to digitize color signals from industrial and home color video cameras, video cassette recorders and laser disks, Chorus Data Systems said.

The user reportedly has control of the color intensity, tint, brightness and contrast. RS-170A synchronous is available on all signals and there is a separate monochrome output for black-and-white applications.

The half-width IBM PC-bus-size card is priced at \$295, and the stand-alone packaged version is \$350.

Chorus Data Systems, P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

ing system that is said to let users integrate images, text and numbers into complex documents and data bases.

The Model 700 Word Image Processing System (Wips) is a front-end peripheral for the IBM Personal Computer XT, IBM Personal Computer AT and compatibles. It reportedly interfaces with most popular word processing and data base management software for those systems.

The Model 700 consists of Datacopy's Model 210 Image Scanner, Model 111 Imaging Interface, Wips software and interconnect cable. To operate the system, the user raises the cover of the Model 210 and places a document face down on a glass plate. The contrast level can be set manually from the scanner control panel or automatically from the host. Scanning takes about 30 seconds.

Resolution of the scanned image is said to be 200 dot/in. across the horizontal scan line, while the user can select either 200, 150 or 100 line/in. vertically.

The price of the system is \$4,000.

Datacopy, 1215 Terra Bella Ave., Mountain View,

Calif. 94043.

■ **Random Access, Inc.** has introduced its R/A-350 mouse and interface board for Digital Equipment Corp. Rainbow, Decmate and Professional personal computers and VT200 terminals.

The R/A-350 reportedly generates cursor position and mouse button information in a form compatible with keyboard information and does not require modification of software.

Its parameters of mouse resolution, motion key codes and button key codes may be altered by users.

When power is turned on, three buttons on the R/A-350's mouse are defined to be the equivalent of pressing Do, Resume and Exit on the keyboard.

The R/A-350 interface is priced at \$245, and the mouse is priced at \$250.

Random Access, 246 Highland Road, Pittsburgh, Pa. 15235.

■ **Altext, Inc.** has announced a version of its Altext disk conversion product said to be able to

convert diskettes produced on other microcomputers to a format usable on the Digital Equipment Corp. Decmate I and Decmate II.

Altext, a hardware and software product, reportedly makes the conversion using either disk-to-disk transfer or communications. In disk-to-disk conversion, one disk is written to another without the use of a transfer medium or communications, the vendor said.

Altext is offered in three systems: the low-end ACS, the mid-range System I and the top-end System II. Hardware for the ACS is priced at \$4,500. Hardware for the System I is priced at \$7,500. Hardware for the System II is priced at \$15,000.

Software is priced for each system between \$100 and \$500 per package, Altext said.

Altext, 210 Lincoln St., Boston, Mass. 02111.

sion of its Digital Paintbrush product for the IBM Personal Computer.

The Digital Paintbrush, a hardware/software graphics package, reportedly permits creation of full-color charts, diagrams, pictures and text. The Digital Paintbrush permits its images to be shown on a color monitor and photographed, according to the vendor.

Included are a pen-like drawing device and two rotating sensors housed in a plastic case attached to the pen tip by control lines, the vendor said.

Movement of the pen reportedly is detected by the sensors and interpreted by the software.

According to the company, the software enables users to store, organize and display pictures in the form of a slide show.

Digital Paintbrush is priced at \$299, the company said.

The Computer Colorworks, Suite 201, 3030 Brideway, Sausalito, Calif. 94965.

■ **The Computer Colorworks** has introduced a ver-

■ **Datacopy Corp.** has announced an image process-

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entered into the main programs as commands, Borland said.

Two data encryption modes

Superkey also supports two modes of data encryption — direct overwrite protection and text-file mode. The first is said to prohibit reconstruction of a nonencrypted file — no second file is generated. The latter method enables users to encrypt binary files by transforming them into Ascii files, Borland said.

Superkey reportedly also supports user-definable macro titles, clear screen, access of Help menus, changes of current logged drive or path on hard disk, date and time information, alternate arrow key definition and key click switching.

The software can recall automatically the last 20 entered commands and display them in a menu window, according to Borland. Users are said to be able to select one or more commands to be edited and reused, even at the operating system command level.

Borland International is located at 4113 Scotts Valley Drive, Scotts Valley, Calif. 95066.



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COMPUTER INDUSTRY

Firms find union blissful

McCormack & Dodge execs cite freedom to plan for long-term as biggest benefit of firm's sale

By David Olmos
CW Staff

NATICK, Mass. — As McCormack & Dodge Corp. management tells the story, it was a marriage born of necessity that has evolved into a blissful partnership.

When Dun & Bradstreet Corp., the New York-based financial and information services giant, came courting two years ago, McCormack & Dodge (M&D) was a fast-growing maker of business applications software with a yearning to become bigger and better known. But the privately held M&D was hampered by cash flow problems and the persistent need to raise new capital from sometimes recalcitrant investors. Meanwhile, it was trying to cope with stiff competition from a number of rivals — some of them larger and richer — in the booming software market.

"It was clear we had to do something," said Frank Dodge, M&D's president and

chief executive officer, in explaining the firm's 1983 decision to either become a public company or seek a buyer. "It was a selling process all the time. . . . It was a constant struggle to juggle things and keep the cash coming in."

Several interested buyers, including Dun & Bradstreet, had approached the company with proposals. For reasons primarily involving

corporate direction and the issue of autonomy, Dodge and James McCormack, the firm's chairman of the board, eventually decided to sell the firm that they had co-founded in 1969 to Dun & Bradstreet. The sale took place in May 1983, and McCormack left the company in 1984 to pursue a career in real estate investment.

Today, nearly two years after the sale, both parties agree that the partnership has been a successful one.

"They [M&D] are delivering what we

See **PROFILE** page 120

COMPANY PROFILE

Speakers at chip maker meet cite need to improve methods

By Kathleen Burton
CW West Coast Bureau

NEWPORT BEACH, Calif. — With semiconductor sales in the U.S. and Europe expected to total \$16 billion in 1985, manufacturers of semiconductor equipment and materials are under pressure to improve manufacturing processes, industry representatives said recently.

A number of industry problems were addressed by speakers at the eighth annual Semiconductor Equipment and Materials Institute Information Services Seminar here.

According to Donald Van Luvane, vice-president of Kulicke & Soffa Industries, Inc., a semiconductor manufacturer in Horsham, Pa., the industry's rapid growth

during the last decade has brought with it semiconductor manufacturing processes that were unknown 10 years ago. But while semiconductor manufacturers continue to develop new production equipment and materials, he said, advances in integrated circuit assembly and factory automation have lagged because the industry "still doesn't understand the root problems of factory automation."

Van Luvane said industry executives can analyze statistical data but still think factory flow and equipment design processes are "a magic process." He said this is compounded by manufacturers — including Hewlett-Packard Co., Texas Instruments, Inc. and Motorola, Inc. — that

See **CHIP** page 134

DG chief sees slower growth in year ahead

By David Olmos
CW Staff

BOSTON — Data General Corp. President Edson de Castro, citing predictions of an economic slowdown, said he does not expect the Westboro, Mass.-based company's revenue to grow at the same rate in 1985 as last year.

"The business cycle does not appear to be maturing," de Castro told shareholders at the company's annual meeting here Jan. 30. Because capital spending by business is expected to slow, he said, the company does not expect to match its 1984 revenue growth rate of 40%.

DG recently issued its results for the first quarter of fiscal 1985, ended Dec. 29, reporting revenue of \$333 million, compared with \$240 million for the comparable period in fiscal 1984. Profits for the period totaled \$23 million, or 87 cents a share, compared with \$10 million, or 40 cents a share, a year earlier. Because of an accounting change, DG's first quarter this year was one week longer than the previous year.

De Castro said that while orders so far this year are "substantially higher" than a year ago, he is "more cautious" about the coming year.

De Castro said orders for the company's highly promoted Data General/One portable computer, introduced last year, have been "satisfactory." He acknowledged that most customers of the portable unit have been OEMs and dealers, not the Fortune 1,000 market the computer was targeted at. "It is still too early to determine the success of the market," he added.

Questioned about reported discussions between DG and IBM over the sale of Rolm Corp.'s military computer division, de Castro confirmed that talks are taking place but said there is "nothing definitive" yet with IBM. In approving IBM's acquisition of Rolm last year, the U.S. Justice Department ordered IBM to sell off Rolm's Mil-spec unit, which makes rugged versions of DG superminicomputers for sale to the mil-

See **REVENUE** page 134

■ A look at the operations of a Japanese agency focusing on information technology development, funded jointly by government and industry/**128**

■ The downturn in the semiconductor market caused a wafer fabrication operation to schedule a two-week shutdown/**132**

■ Hogan Systems, Inc. hinted that it will trim its work force after posting a \$1.4 million loss for the third quarter/**134**

Datapoint takeover fight reaches bare-knuckles stage



INDUSTRY INSIGHT

Peter Bartolik
CW Senior Editor

The gloves have come off in the battle for control of Datapoint Corp., and the cautious sparring has been abandoned in favor of a bare-knuckles brawl aimed at winning over the company's shareholders.

Arbitrageur Asher B. Edelman, who moved in on Management Assistance, Inc. and Mohawk Data Sciences Corp. and convinced both companies, in essence, to liquidate themselves, recently withdrew his controversial offer to buy out San Antonio-based Datapoint, and said

he will seek consents from shareholders to take over the company's board of directors.

Edelman, after gaining control of 10.8% of the company's shares, presented an offer to buy the company's remaining stock for \$416.3 million or \$23 a share. Datapoint's board, however, objecting to certain financial guarantees that Edelman wanted included in the deal, rejected the offer and invited Edelman and any other interested parties to up the ante.

Other measures threatened

Edelman said his bid would stand, and he threatened to take other measures — seeking consents — if the offer was not accepted. It was not, and Edelman said he would

seek consents.

Such a move would enable him to replace the board of directors without holding a shareholders' meeting if shareholders representing more than 50% of the stock agreed to the plan.

Datapoint, which manufactures computers and networks aimed at office automation applications, has been through a downturn in fortunes, and its current management seems tired of the fray and willing to accept a favorable buy out.

A cash cow

But Datapoint's products are aimed at a market just gathering steam, and its reportedly profitable service organization is the type of entity that many capital-intensive

corporations would dearly like to acquire as a cash cow.

Splitting up the company and revamping management may be just the cure for Datapoint's current malaise, and it almost certainly would provide current shareholders with an immediate payoff.

But there is something more than just a little distasteful about submitting to an arbitrageur who wants to participate in the rewards while obtaining a premium not available to shareholders in general.

Edelman would undoubtedly argue he deserves something for making it all happen, but that is just like a gambler using somebody else's money and requiring the backer to guarantee him a return if somebody else wins the hand.

COMPUTER INDUSTRY

Upping the marketing ante is key to firm's growth plan

By David Olmos
CW Staff

During its early years, McCormack & Dodge Corp. (M&D) was a reasonably successful software company. Revenue and profits rose steadily, if unspectacularly, as the firm gradually built a loyal base of customers among IBM mainframe users. Cofounders James McCormack and Frank Dodge, in fact, handled all the company's sales calls during its first eight years.

But as its product offerings grew, M&D began to realize the need to shed some of its small-company ways in order to better compete against a new crop of business software concerns. It was not until 1982, however, when the firm's revenues hit \$32 million, that a full-fledged marketing department was created with its own senior manager.

"We always tended to think of ourselves as more of a product company, but we began to recognize the fact that you can only sell so many products by word of mouth," said Robert Weiler, M&D's vice-president of marketing. "We came to the recognition that if we wanted to play in the big leagues, we had to have a well-oiled marketing and sales force."

Since its 1983 acquisition by Dun & Bradstreet Corp., M&D has mounted an aggressive marketing campaign, with an aim of spending about the same percentage of revenues — roughly 3% — as its main rivals, Management Science America, Inc. (MSA) and Cullinet Software, Inc.

Today, the company has sales representatives in 40 countries and a 75-person sales staff scattered across nine district offices in the U.S. Its products are installed at more than 3,000 mainframe and large minicomputer sites. (See Figure 2, page 124).



McCormack

M&D built its business selling financial applications — general ledger, accounts payable, fixed asset analysis — to banks, insurance companies, manufacturing companies and other IBM mainframe users. However, during the past several years the company has broadened its product line with the aim of becoming, in the jargon of the software industry, a "total solutions" vendor. In doing so, the company has pitted itself against some new competitors.

"We're offering more, so our competition has changed," Weiler explained. "Instead of going into a particular market niche and saying we're the best in that niche, we're now going in and saying we can offer you the best solution. Now we're competing against the Cullinets and MSAs of the world."

McCormack, who last year quit his Weiler post as chairman of the board but maintains close ties to the company, believes the firm's Millennium-based technology poses a different kind of marketing challenge for the company.

"It's one thing to sell an application product because you're selling it to people who are knowledgeable in the applications," McCormack said. "But to sell a software technology that is a productivity or development tool is a different sell. You really have to get somebody to understand concepts as opposed to applications."

Competing against companies with larger resources and more experience selling "total solutions" poses a difficult challenge for M&D. In the past, the company often lost sales because it

lacked a particular product — a payroll package, for instance — that would provide a customer with a full line of applications.

Because the Millennium series incorporates many features of a data base management system (DBMS), there was speculation at the time of its introduction that M&D might be moving into the DBMS market — an assertion company executives denied.

Last October, though, M&D signed a marketing agreement with Applied Data Research, Inc. (ADR) that will enable Millennium products to run ADR's Datacom/DB DBMS environment.

Interestingly, ADR earlier had inked a similar pact with M&D arch-rival MSA.

According to Weiler, "We're positioning ourselves so we can go to the independent [data base vendors], the [IBM] CICS market and the IBM data base market, which is IMS DB2 [IBM's new relational data base product]."

"We aren't going to jump into the data base marketplace," he observed. "And we certainly are not going to develop a DBMS [internally]."

Linking critical to growth

Peter Lowber, an industry analyst for the Yankee Group in Boston, believes M&D's efforts to link its products to DBMS environments are critical if the company is to retain its present large customers and gain new ones.

"I think DBMS software is the foundation in any big data center," he said. "Perhaps general applications will remain in data centers in the future, but some will be moved out."

Industry analysts have speculated that M&D and its parent firm might move toward integrating M&D applications with D&B Computing, Inc.'s Nomad2 Information Center, but according to Weiler, there are no plans to unite the two.



Weiler

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thought we were going to get," said David Fehr, a corporate senior vice-president who heads Dun & Bradstreet Computing Services, Inc., a Wilton, Conn.-based division of the parent firm.

Life with a rich uncle

From M&D's perspective, the money raised from the sale of the company — about \$50 million in cash — plus subsequent investments by Dun & Bradstreet has provided a significant financial boost. Based on interviews with M&D executives and employees, life under Dun & Bradstreet might be likened to having a rich uncle who visits infrequently and does not meddle in family affairs.

"[The acquisition] has been better than I expected," said Dodge, a former systems engineer for IBM and one-time elementary school math teacher. "They've been very supportive; they've left us alone. It's been great."

Dun & Bradstreet's investments have enabled M&D to strengthen its marketing, product R&D, customer support and other activities. Robert Weiler, vice-president of marketing for M&D, said, "[Dun & Bradstreet] has allowed us to get [R&D] projects underway that have planned returns in 1987 or 1988. Imagine a software company talking about working on projects four years out. That's something we've never been able to do before."

The influx of money has also enabled the company to open customer training schools in Los Angeles and Chicago, to spruce up its corporate headquarters in Natick, Mass., and, in general, to help it create among users and prospective customers the image of a successful and stable company.

Additionally, M&D now works with Dun & Bradstreet's growing collection of computer software and services units in sharing expertise. The parent firm recently snapped up RTZ Computer Services Ltd., a British-based financial software company, whose acquisition has enhanced M&D's European software business.

Rapid growth in the 1980s

M&D's growth during the 1980s has been rapid. Revenue ballooned from \$15.6 million in 1980 to an estimated \$59 million in 1983, industry analysts said. Dun & Bradstreet does not separately report revenue of its subsidiaries. The number of employees has nearly quadrupled in the past three years to 1,200.

The company, which no longer makes its financial reports public, claims its sales grew about 50% in 1984, which would put it close to \$90 million in sales for the year. (See Figure 1).

If M&D's pretax profits stay within their range of the past several years — between 6% and 9% of revenues — the company would realize profits of between \$5 million and \$8 million for 1984.

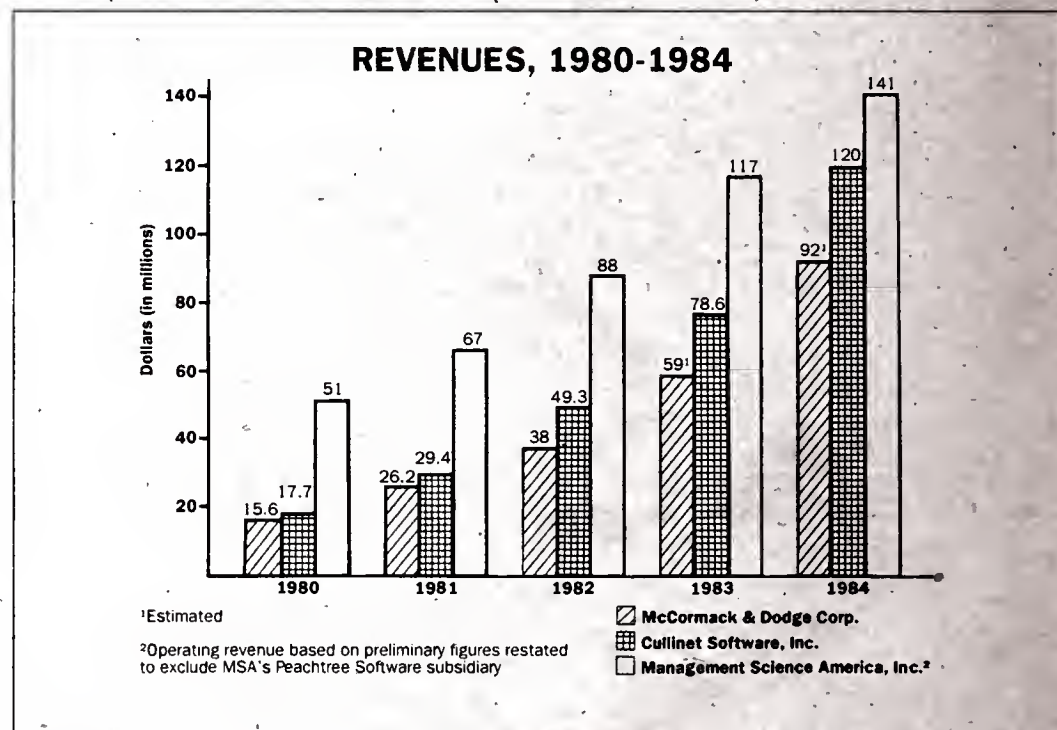


Figure 1

CW CHART

Although Dodge asserted that the firm has "always been profitable," he said M&D has always given top priority to growth instead of profitability. He said Dun & Bradstreet's management shared his philosophy that growth and market share are more important than profit for a company in a high-growth market like computer software.

"[Dun & Bradstreet's] goal for us clearly is to grow," Dodge said. "They would like to see us become the No. 1 software company in the world. They would like to see us run

the company in a reasonable way and not be careless or sloppy in how we spend money."

Dun & Bradstreet's own description of its objectives for the division seemed to square with Dodge's. The parent firm, Fehr said, wants M&D to become a "more established player" in the applications software market, to broaden its product line and to increase its revenue and market shares.

He added that profitability is more a concern for the long run.

See PROFILE page 124

COMPUTER INDUSTRY

Frank H. Dodge, president and chief executive officer of McCormack & Dodge Corp. (M&D), was recently interviewed by David Olmos, Computerworld staff writer. Excerpted below are his responses to questions relating to his company and the general state of the software industry.

Q What are your goals for the company?

I would like to see us become the No. 1 software company in the world. But I don't want to see it happen at the expense of losing any of the things that have been so important to me.

Q It's been said the "corporate culture" changes once a company nears the \$100 million annual revenue mark. Now that M&D is approaching that, has anything changed?

I don't buy the \$100 million mark as some kind of a magic barrier. It's very important to me to preserve the culture here. I work pretty hard at it.

The duality is that you have to change because our industry is changing, the competitive marketplace is changing, the technology is changing, the size of the company is changing. So we have to change. We have to look [constantly] for ways to change and improve what we are doing, but we have to do that in the context of the basic things that have made the company successful.



FRANK H.
DODGE

We have a company cafeteria. I try to have lunch there as often as I can, just so people can see me. I work hard at knowing all the people as best I can. I have breakfast once every three to four weeks with 10 people — nonmanagement people from different departments whom I've never met before.

Q What are your views of the software industry's competitive environment at present?

I think there's a shakeout coming. I think that

there are some companies that have become a little panicky based on, perhaps, not reaching their hoped-for or preannounced goals. So they're doing things that are pretty shortsighted, such as discounting. I think some of the smaller companies will be forced out or forced to merge because it's clearly becoming a market where you have to have a full product line. Increasingly we're seeing that companies want to buy all their software products from one vendor. And there are enough good alternatives now that they really can do so."

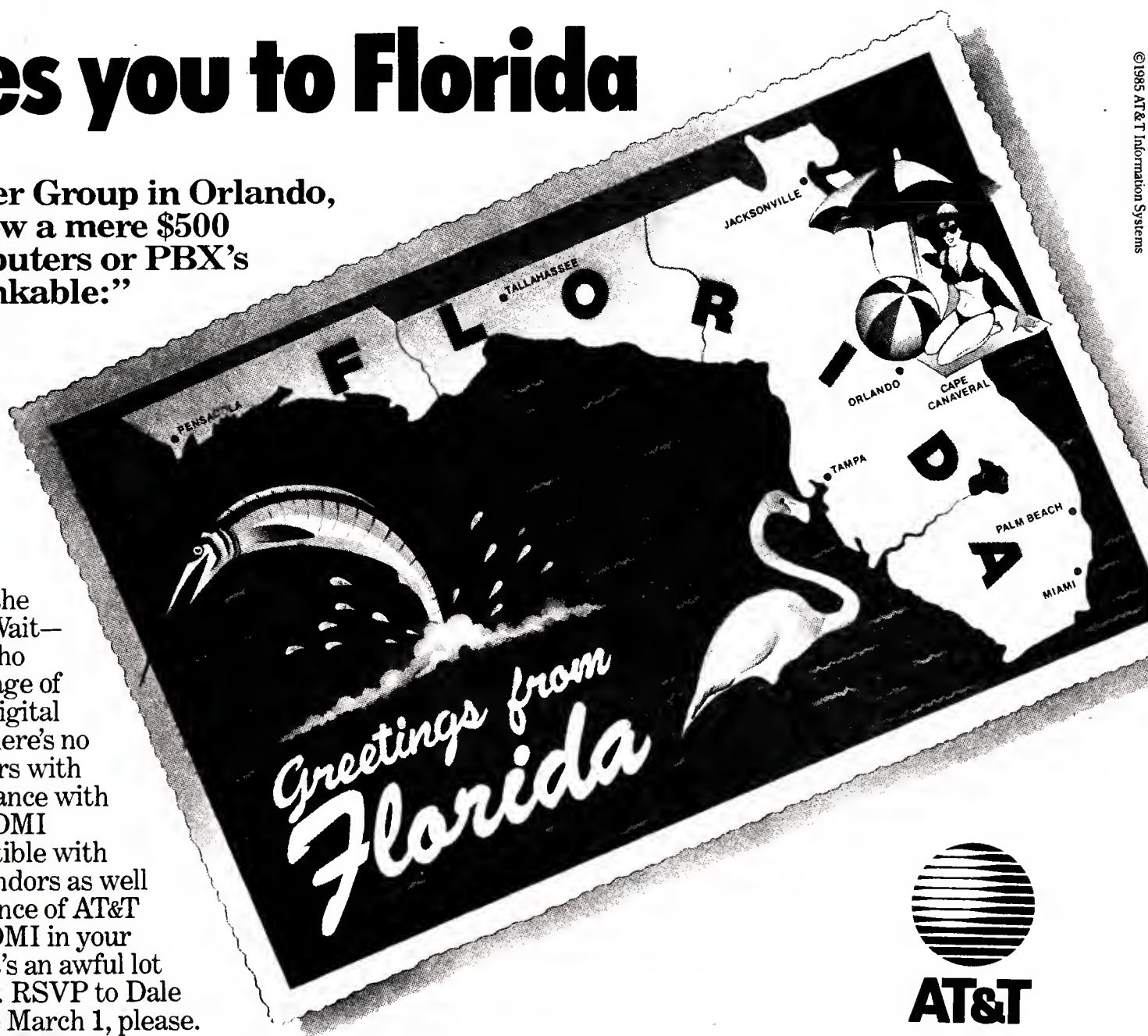
Q If Dun & Bradstreet Corp. had not come along as a buyer, would your company be public today?

I don't think so. That would have been such a change. I tell you, there's nothing like hindsight. I'm tremendously glad we're not a public company because of what's happened [to the stock price of some publicly held software firms. Dodge cited the steep decline in the stock of Management Science America, Inc. (MSA), a chief competitor.] If you're an investor in MSA or an analyst who's promoted the stock, what are you doing now? And what are John Imlay [MSA's board chairman and chief executive officer] and Bill Graves [MSA's president and chief operating officer] hearing from those people? God! Who wants that?

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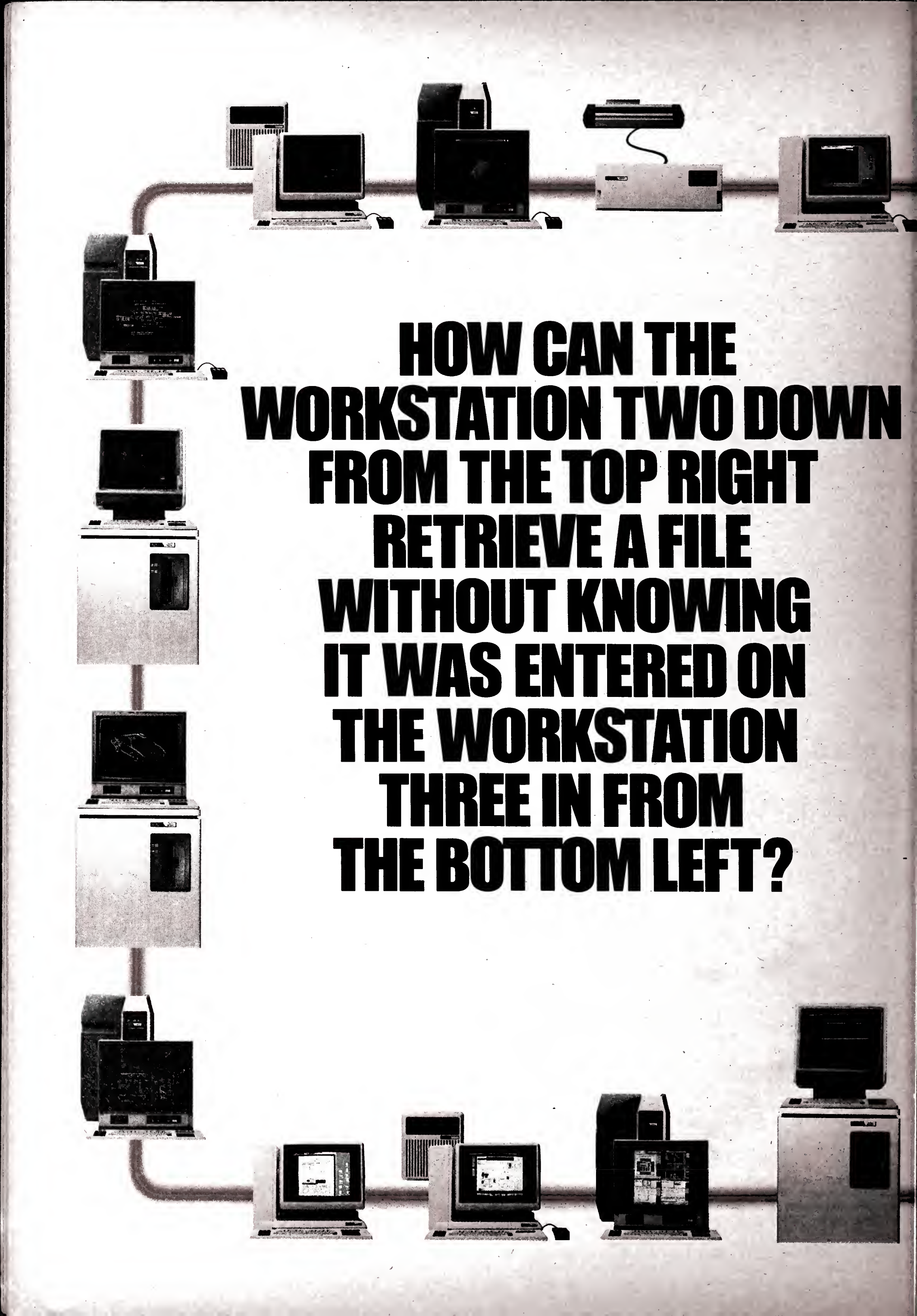
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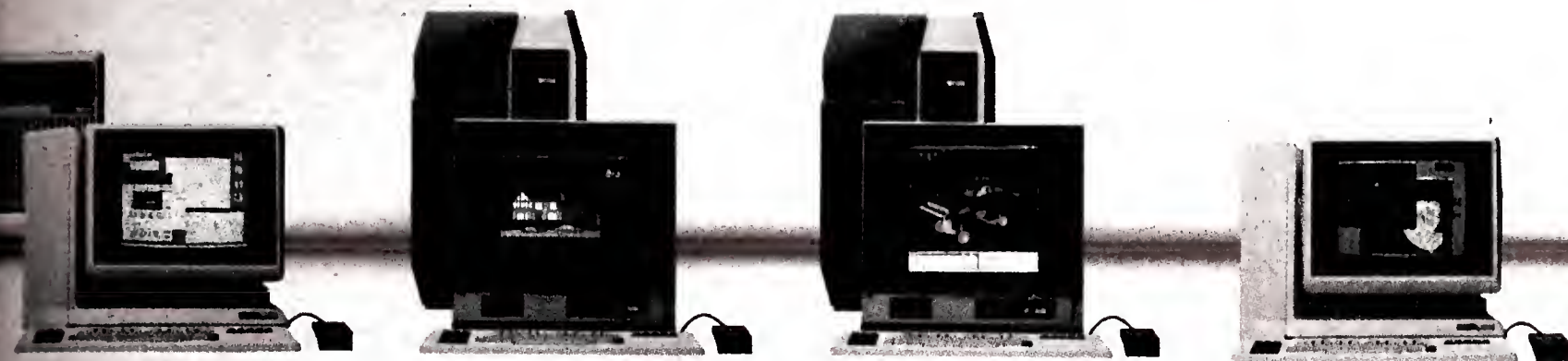


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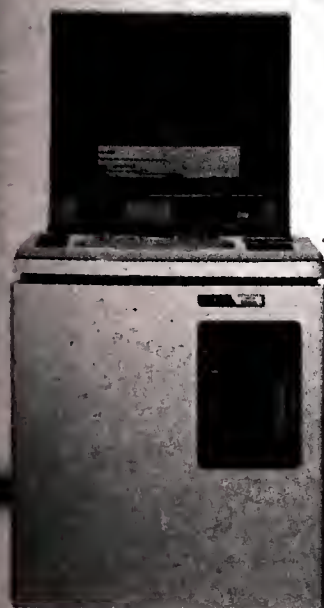
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COMPUTER INDUSTRY

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(as of January 1985)**

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PO:Millennium (Purchase Order)	250
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CP:Millennium (Capital Project)	175
HR:Millennium (Human Resources)	200
Millennium:SDT (Systems Development)	50
Interactive PC Link	150

Figure 2

CW CHART

PROFILE from page 120

M&D introduced its first product in 1969, a program for fixed-asset analysis and accounting applications, which chalked up \$90,000 in sales in 1970. At the time, packaged software was in its infancy. However, the demand for packaged software soon accelerated. No overnight success, the company's annual revenue did not top \$1 million until 1977. McCormack and Dodge personally made all sales calls during the firm's first eight years.

However, when the company unveiled a general ledger package in 1977, sales started to climb. In 1981, M&D introduced an on-line query program called Hilite and the following year acquired a human resources package, H/R Plus, from Dyatron Corp. The most significant product

development came in 1983 when M&D announced it was rewriting its entire series of on-line packages to create a new group of packages dubbed the Millennium series. Now the cornerstone of the M&D product line, Millennium is an on-line development and customization technology for IBM mainframe and plug-compatible users under which all applications share common system functions.

The year 1983 was a watershed one for M&D. Not only was it introducing the Millennium technology and retraining its sales force in that technology, but it was also deciding whether to go public or be acquired.

About this time, several software companies, including Cullinet Software, Inc., Management Science America, Inc. and Lotus Development Corp., had already gone public, rais-

ing enormous capital and bringing exceptional wealth to the firms' principals almost overnight. In fact, M&D had a prospectus prepared in the event a suitable buyer could not be found. "A lot of people were trying to get us to go public," Weiler recalled. "Every morning another company would go public at something like 80 times earnings. People were saying, 'Look at that; that's what we can get if we go public on Monday.'"

But Dodge and McCormack decided that the drawbacks of going public outweighed the financial gains. "It was pretty clear that in being a public company, Jim McCormack and I would be spending a lot of time talking to the financial community, to investors and analysts," Dodge said. Dun & Bradstreet also promised to take an arm's length position in overseeing the unit, allowing M&D to operate virtually autonomously. Dodge said that promise has been kept so far, adding that the parent firm has placed no personnel at M&D.

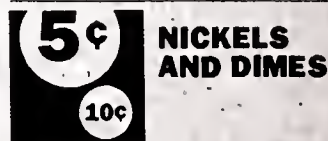
"Frank Dodge is the chief executive officer and he runs the compa-

”

Life under Dun & Bradstreet might be likened to having a rich uncle who visits infrequently and does not meddle in family affairs.

ny," Fehr said. "I consider myself more his interface with the company than his boss." Dodge does, however, provide monthly reports to Fehr.

Freed from the obligation to justify quarterly performance, M&D executives said they have more time to concentrate on long-range planning and other business concerns. "This has been a lot more fun," Weiler said. "I sleep nights. A quarter can come and go, and the only way I know is by the moon or something."



Data Access Systems, Inc. reported a revenue of \$34.7 million for the year ended Aug. 31, compared with \$32.9 million in the same period one year earlier. In the year just ended, the company reported income from continuing operations of \$2.9 million, compared with a loss of \$40.6 million from continuing operations one year earlier. Including a net gain of \$676,438 relating to Chapter 11 proceedings under the Federal Bankruptcy Act and a reduction in income taxes arising from a \$1.67 million carryforward of previous years' operating losses, the company reported a net income of \$3.6 million for fiscal 1984.

Televideo Systems, Inc. announced that profits for the fourth quarter ended Oct. 31 were \$30.5 million, a 30% decrease from \$43.6 million in the same quarter a year ago. This resulted in a net loss for the quarter of \$7.9 million, or 19 cents per share, compared with profits of \$5.7 million, or 14 cents per share, in the same quarter one year earlier.

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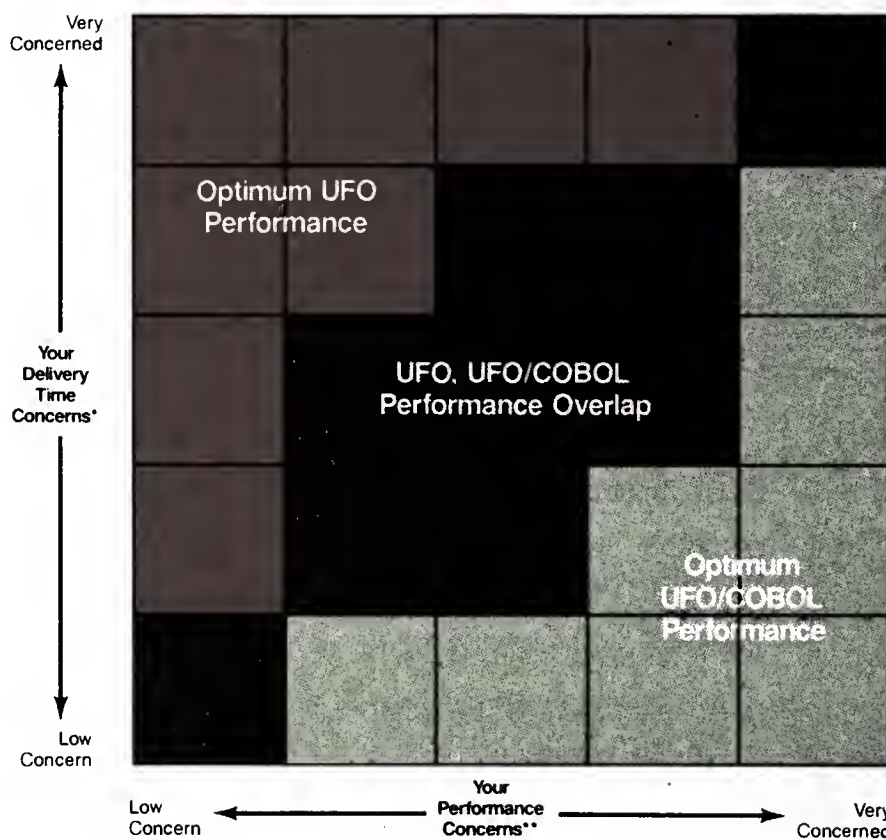
UFO dramatically reduces the time required to develop and maintain new programs. What might take months to put up and get running with Command Level COBOL can now be accomplished in as short a time as one day. Because UFO is so easy to use, your entire programming staff can develop applications with it. And even end users can participate in the development of programs and access data for one-time inquiries.

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COMPUTER INDUSTRY

Jipdec guiding Japan's information processing growth



OUTSIDE LINES
John McWilliams

The Japan Information Processing Development Center (Jipdec), a semi-private Japanese organization founded in December 1967, seeks to promote "information processing and the information processing industry in Japan."

"Legally speaking, Jipdec is a foundation," explained Toshihiko Nishiwaki, executive director of Jipdec. "It was established by endowments from the Ministry of International Trade and Industry [Miti],

Nippon Telegraph and Telephone Public Corp. [NTT] and the private and public companies and corporations that make up its membership. It relies on these organizations for its annual funds and the appropriations necessary to carry out its various activities."

"Although Jipdec is funded in large part by Miti, it is not directly controlled by that ministry, as so many folks want to believe," Nishiwaki said. "Nevertheless, Jipdec's official and unofficial ties with Miti are very close. For example, Jipdec submits annual reports of its activities to Miti and usually has one or more retired Miti members serving in top executive positions. Thus, while Jipdec is free to plan its operations as it sees fit, Miti's influence on the way those operations are carried out is quite strong. Still, the relationship is more symbiotic than authoritative."

Jipdec is composed of four departments: administration, business, engineering/research and development. Rounding out the organization are the Microcomputer Promotion Center; the Institute of Information Technology (IIT), a special training center; and the Japan Information-Technology Engineers Examination Center (Jitec), a testing center. Both IIT and Jitec are listed as affiliated organizations but come under the direct control of Jipdec.

Studies conducted in Japan and abroad

Jipdec engages in studies and surveys both within Japan and abroad, as well as research and development of hardware and software systems; consultation services; education, training and testing of systems engineers, programmers and other information-processing-related personnel; and the exchange of information with overseas government and private organizations.

"Many of our studies deal with problems related to hardware and software development and/or stan-

dardization, the results of which often serve as input for government decisions regarding legislation and the formulation of standards applicable to information processing in Japan," Nishiwaki explained.

Jipdec conducts two types of studies: those carried out on a regular basis to update information on designated aspects of the information processing industry and those conducted in response to specific requests from Miti, NTT and more than 200 other Jipdec members.

"Systems development now accounts for nearly half of Jipdec's overall operations, requiring the efforts of approximately 70 of our 150 full-time [employees]. And Jipdec's two affiliated organizations, IIT and Jitec, are dedicated to carrying out basic and advanced training and testing, respectively," Nishiwaki pointed out.

Some practical systems currently under development are a trademark retrieval system and an administrative information system. The latter will incorporate a massive data base containing all the laws, statutes, ordinances and regulations that currently comprise the Japanese legal system.

IIT, since its establishment as the education and training arm of Jipdec in 1976, has trained more than 15,000 information processing technicians and managers from various parts of government and private industry. Subjects offered range from computer science, business and management courses to systems design and software engineering, all packaged to present trainees with equal amounts of theory and practical applications.

Beginning in early 1984, Jipdec also assumed full responsibility for administering Japan's national Certified Data Processing Examination (CDPE) aimed at certifying Japanese systems engineers and programmers. Jipdec established Jitec last April to

prepare and administer this annual examination. "To the best of my knowledge, Jitec is the first organization of its type anywhere in the world," Nishiwaki said. "No other country has an organization devoted solely to the testing and certifying of information processing personnel."

During 1984 more than 170,000 systems engineers and senior and junior programmers applied for the CDPE, with around 100,000 of those technicians actually sitting for the test. And the number of applicants is expected to continue to grow in years to come.

Jipdec currently publishes two regular English-language reports: the annual *Computer White Paper* and *Japan Computer Quarterly*, formerly known as *Jipdec Report*. The former is an annual review and update of computer utilization and the status of the information industry in Japan, while the latter takes the form of a quarterly magazine, designed to provide readers with articles on the latest technological, legislative and commercial developments in the Japanese data processing industry.

Concerning future ventures, Nishiwaki said Japan needs a data base clearinghouse and that Jipdec is considering that role. Also, he said, the center will expand its role as an information processing consultant and provide those services to regional municipal governments striving to update their information networks and data communications capabilities as Japan moves toward an advanced information society.

McWilliams is managing director of the Word Shop, Ltd., a Yokohama, Japan-based firm specializing in Japanese-to-English translations of primarily computer-related papers, reports and articles. He has worked with Jipdec to translate the Computer White Paper and the Japan Computer Quarterly.

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COMPUTER INDUSTRY

Mexico rejects plan for IBM microcomputer factory

By Kathleen Burton
CW West Coast Bureau

MENLO PARK, Calif. — Mexican government officials recently rejected a proposal submitted by IBM last year to build a wholly owned microcomputer factory in Mexico. The Mexican government had previously indicated it might relax a requirement that foreign factories

located there be at least 51% owned by Mexican nationals.

Mexico's National Commission of Foreign Investment, which voted on the proposal, said in a statement that the plan was rejected because, "There are already companies in existence that manufacture personal computers with a majority of national capital."

Mexican-based joint development companies sponsored by other U.S. vendors had reportedly lobbied against the IBM proposal, arguing that a wholly owned IBM Mexican operation could wipe out all other competitors in Mexico's fledgling personal computer market.

Hewlett-Packard Co. and Apple Computer, Inc. have

complied with Mexico's majority ownership rules while establishing manufacturing projects in Mexico, but both HP and Apple said they engaged in no formal lobbying efforts against IBM's proposal.

"We followed Mexican government guidelines and have been happy with the result," HP spokesman Rob

Bouzon said. HP opened its joint venture minicomputer manufacturing operations in Mexico in 1982 and began manufacturing personal computers there in April 1984, Bouzon said.

Barbara Krause, a spokeswoman for Apple, said the firm's Mexican subsidiary, Apple de Mexico, has manufactured its Apple IIe microcomputers there for about a year. "We're building for the long term, using Mexican keyboards and developing software with Mexican vendors," she said. Krause said Apple did not lobby against IBM's proposal but added, "We do not control what Apple de Mexico does."

Proposed exports

IBM reportedly told the Mexican government that its proposed assembly plant would produce over half a billion dollars in exports during the next four years and that the fixed assets at the plant, to be located in a suburb of Guadalajara, would be \$6.6 million, with another \$30 million slated for technical assistance and purchase of microcomputer components.

The Mexican government is reportedly still seeking further concessions from IBM, industry watchers said.

In a prepared statement, Rodrigo Guerra, president of IBM Mexico, said the company will "continue its dialogue with the Mexican government, examining alternatives and other proposals that will permit its microcomputers to reach Mexican users."

John Dean, an analyst at Montgomery Securities in San Francisco, said Mexico has historically taken a strongly nationalistic position with foreign multinational companies. Dean said the Mexicans believe that giving up a majority ownership position in the IBM case would lead to foreign majority-owned projects in other industries, such as commercial real estate and oil.

IBM may ultimately accept a face-saving compromise but will not accept majority Mexican control according to Brian Jefferey, vice-president of International Technology Group, Inc. in Palo Alto, Calif.



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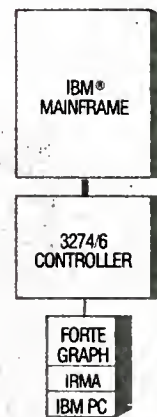
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"We got it so cheap because it's very poor at math."

COMPUTER INDUSTRY

Paladin President Folk resigns; vice-president named to post

SANTA CLARA, Calif. — Paladin Software Corp., which merged with troubled Visicorp in November, recently announced the resignation of its president and founder, Ray Folk.

Folk, who started Paladin about a year and a half ago and helped engineer the merger agreement, said he left because he could no longer pursue his ideas or interests at the company.

Named to the post of president and chief executive officer was Ted Newlin, formerly sales and marketing vice-president. David Douglass, former chief financial officer of Paladin, assumed the role of executive vice-president and chief operating officer.

The company also announced the layoff of 18 employees, primarily in the firm's development division. Paladin's total work force now numbers 55. The layoff reflects a realignment of the firm's business strategy, Douglass said.

Paladin has scaled back its internal development efforts, which had focused on designing a business productivity package, from a large-scale engineering approach to a "tiger team" of people, the company said.

In addition, the company will be putting more emphasis on marketing the five key products originally sold by Visicorp, including Flash Calc, PC Paint, Visi Plot, Visi Schedule and Visi On, he said. Paladin will also extend its role as a software publisher. Within the next six months, Douglass said, the firm will announce the launch and distribution of software designed by outside authors.

Stratus, IBM ink OEM pact

MARLBORO, Mass. — Stratus Computer, Inc., a vendor of fault-tolerant superminicomputers aimed at the transaction marketplace, recently signed an OEM agreement that allows IBM to remarket the firm's systems on a nonexclusive basis.

A Stratus spokesman said that the agreement, which took effect Jan. 31, gives IBM the option to purchase selected products in the Stratus line and to remarket those products either directly or on a value-added basis.

The spokesman declined to state specifically which Stratus products are included in the agreement but noted that most of the fault-tolerant line is involved. The spokesman said

that the company has already shipped evaluation systems to IBM's Systems Products Division.

IBM not committed

An IBM spokesman, who maintained that details of the Stratus contract are confidential, said that IBM has not yet formally made a commitment to remarket Stratus hardware as part of its product line.

Stratus will continue to sell its systems to end users and can still remarket its systems to other third-party vendors, according to the Stratus spokesman.

Currently, the Stratus/32 product line consists of three models: the FT 200, XA 400 and XA 600.

Cray reports 1984 profit of \$45.3 million

MINNEAPOLIS — Cray Research, Inc. recently reported profits of \$45.3 million, or \$3.06 per share, for fiscal year 1984 on a revenue of \$228.7 million.

Included in the company's profit statement was an extraordinary benefit of \$6 million, or 41 cents per share, reflecting a 1984 tax law change eliminating deferred taxes owed by domestic international sales corporations.

In 1983, Cray earned profits of \$26 million, or \$1.77 per share, on a revenue of \$169.6 million.

During the fourth quarter, the supercomputer manufacturer experienced a decline in revenue to \$70.8 million, compared with \$82.7 million in the year-earlier quarter. Profits for the quarter declined to \$15.9 million, or \$1.08 per share, compared with year-earlier profits of \$19.3 million, or \$1.31 per share.

During the most recent quarter, the company installed nine computer systems, compared with 12 systems installed in the comparable quarter of 1983.

Met 1984 business plans

John A. Rollwagen, chairman of the company, said the company met its business plans for 1984 by installing 23 new systems and reinstalling eight other systems. Two of the systems were installed for internal software development and marketing support.

Of the 21 systems installed at customer sites, 12 were purchased and nine were leased, he said. During 1983, the company installed 16 new systems, of which 12 were purchased and four were leased.

Rollwagen said demand for Cray's products remains strong and that the company already has under contract half of its anticipated installations for 1985.

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COMPUTER INDUSTRY

Comdisco airs \$61 million profit, posts highest quarterly gain

ROSEMONT, Ill. — Comdisco, Inc. recently reported profits of \$16.3 million, or 61 cents per share, for the first quarter just ended. That marked the company's highest quarterly profits ever and compared with year-earlier profits of \$9.7 million, or 33 cents per share.

Widely regarded as the largest independent computer dealer and leasing company, Comdisco posted a revenue of \$153 million for the quarter, compared with \$135.8 million a year earlier.

Kenneth N. Pontikes, chairman and president of the company, said the record profits were primarily due

to an expanded lease portfolio and an expanded volume of tax-advantaged transactions.

During the first quarter of 1984, Comdisco was operating under the cloud of an Internal Revenue Service investigation of its tax-advantaged transactions; the investigation was ended without any charges of wrongdoing, but the situation served to deter outside investors from participating in financing Comdisco lease packages.

Pontikes said the company entered into 1,874 new leases during the first quarter, compared with 1,238 new leases in the year-earlier quarter.

Tandem boosts profits by 39.5%, tallies \$134.1 million in revenue

CUPERTINO, Calif. — Tandem Computers, Inc. recently reported a 39.5% increase in profits for the first quarter of 1985 and a 26.3% hike in revenue for the same period in comparison with revenue of a year earlier.

The company said profits for the quarter totaled \$14 million, or 34 cents per share, compared with \$10 million, or 24 cents per share, a year earlier.

Revenue for the quarter was \$134.1 million, up from \$108.4 million in the comparable period of 1984.

James J. Treybig, president and

chief executive officer of Tandem, said the company made good progress during the quarter with its attempts to improve overall profitability.

He said total employment decreased slightly while the number of sales employees grew by 7% over the previous quarter.

Treybig added that repricing of the company's Nonstop II system at the end of the last fiscal year produced a positive response among customers.

The repricing also "played a strong role in attracting first-time users to Tandem," Treybig said.

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Siltec furloughs wafer plants

MENLO PARK, Calif. — Siltec Corp. recently announced its silicon wafer manufacturing operations will shut down for two weeks beginning Feb. 18, because of low demand for the wafers.

The company, which also manufactures silicon production and testing equipment, said 650 employees in California and Oregon will be affected by the shutdown. The equipment division, Cybeq Systems, "has not been affected by the overall semiconductor industry downturn and will continue normal operations," the company said.

Siltec also announced 1984 financial results, posting for the year a revenue of \$64.8 million and profits of \$2.7 million, or 78 cents per share, compared with a 1983 revenue of \$44.1 million and profits of \$1.1 million, or 33 cents per share.

Xerox profits decline 33%

STAMFORD, Conn. — Absorbing a fourth-quarter after-tax loss of \$85 million from operating losses and the write-off of its Shugart Corp. subsidiary, Xerox Corp. recently reported that 1984 profits declined 33% from the previous year.

In addition to the costs of phasing out the Shugart disk manufacturing operations, Xerox lost \$10 million for the year through its Crum & Forster, Inc. insurance subsidiary, which posted a fourth-quarter loss of \$23 million. In 1983, the insurance subsidiary posted \$26 million in profits for the fourth quarter and \$145 million in profits for all of 1983.

Including all Xerox operations, the company posted profits of \$291 million, or \$2.53 per share, in 1984, compared with year-earlier profits of \$466 million, or \$4.42 per share.

The company's continuing reprographics and information systems businesses recorded a 1984 revenue of \$8.79 billion, up 6% from \$8.26 billion in 1983. Profits from those businesses were \$354 million in 1984, up 8% from \$328 million in 1983.

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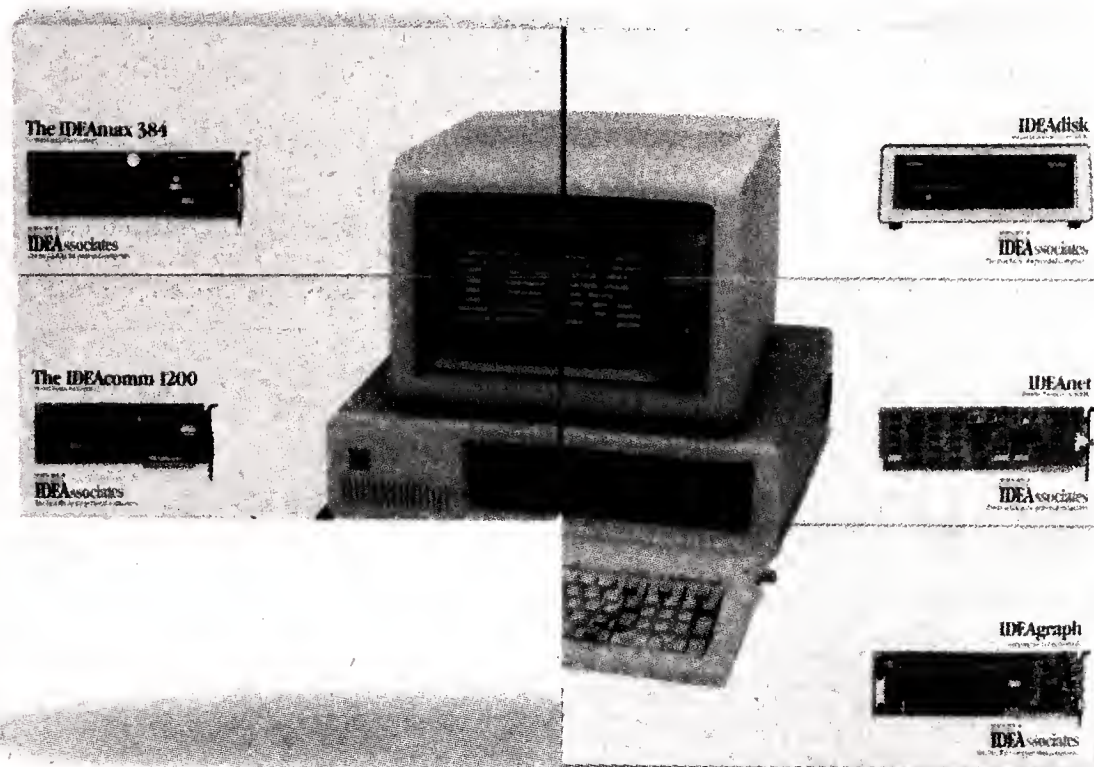
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COMPUTER INDUSTRY

Hogan eyeing layoffs in wake of third-quarter revenue dip

DALLAS — Hogan Systems, Inc. recently hinted that it will trim its work force after reporting a third-quarter loss of \$1.4 million — or 10 cents per share — after tax benefits reduced an operating loss of \$5.5 million.

In the comparable quarter a year earlier, Hogan earned a profit of \$622,000 or 5 cents per share.

A manufacturer of integrated applications software for large financial institutions, Hogan experienced a decline in revenue to \$4.6 million from \$7.2 million a year earlier.

According to Richard Streller, the firm's chairman and chief executive

officer, the results fell well below expectations and were due to delays in the signing of several licensing agreements during the quarter.

The delays, Streller said, were a result of customers seeking more assistance to implement Hogan systems, prospective customers taking longer to study the product before making a commitment and other issues "competing for executive time" in the banking industry.

Streller said the company will take further steps to trim operating costs and improve efficiency, including "selected staff reductions in all parts of the company."

CHIP from page 119

will not talk about ongoing factory operations. Those manufacturers, Van Luvanee charged, are "hoarding information like gold."

He suggested equipment manufacturers improve process monitoring and sensing and incorporate artificial intelligence into production nodes by developing "smart equipment" that will monitor itself. Also needed, Van Luvanee said, are more interfacing standards and the ability to diagnose equipment and processing problems on the manufacturing floor in less time.

'Nastiest chemicals in the world'

According to Dan Rose, president of Rose Associates, an integrated circuit materials consulting firm in Los Altos, Calif., the integrated circuit

materials industry has recently been plagued by several problems related to the handling of toxic chemicals. Rose asserted that "the semiconductor industry uses the nastiest chemicals in the world."

Other trends in the semiconductor materials industry, Rose said, are higher quality control standards for automated environments, the increased use of subcontractors for integrated circuit assembly and a chronic shortage of polycrystalline silicon, the basic material used in semiconductor wafers.

Even though the worldwide poly silicon supply in 1985 will jump a projected 26.9% over last year's supply, increased demand — especially from Japanese semiconductor manufacturers — could lead to shortages, Rose said.

Robert Kopp, president of Kopp Semiconductor Engineering, a New Mexico-based consulting firm, said wafer fabrication processing technology is also rapidly changing, as integrated circuit dimensions increase, and as more experiments with refractory metals like tungsten and aluminum-based metals improve integrated circuit conductors.

Reduced particle contamination

Kopp added that a recent example of a significant improvement in wafer fabrication processing was HP's detection and reduction of process-induced particles during semiconductor production at HP's Corvallis, Ore., plant. Kopp said HP measured the particles with a new laser scan tool and reduced the particle contamination in its equipment environment, thereby increasing integrated circuit output of its largest chips.

According to Robert McGeary, manager of the Semiconductor Equipment and Materials Service at Dataquest, Inc., worldwide semiconductor capacity will increase 10% to 11% annually and will peak in 1989. He predicted that the growth of the Japanese semiconductor industry will outpace that of the U.S. by almost 10% next year. The Japanese, he said, are "in a capital expansion growth phase and we aren't."

In 1984, Japanese semiconductor manufacturers spent 34% of their earned revenue on capital expansion, compared with 22% in the U.S., McGeary said. Unlike the U.S., Japan can support high debt-to-equity ratios, McGeary said, since Japanese capital is funded by debt. In the U.S., capital spending is funded by equity, with a heavy emphasis placed on short-term growth, he said.

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REVENUE from page 119

itary. De Castro said he expects the competition across the company's product lines to become more intense in the coming year but predicted that some competitors may fall by the wayside.

He asserted that the computer community might be better served by having eight to 10 large companies in the market instead of the present "chaotic scramble among lots of competitors."

On the subject of IBM's growing dominance in the industry, de Castro said that there is no other company that he "respects and fears" as much as IBM.

He added, however, that "while [IBM is] big and good, it can be beaten from time to time."

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Spokane area firm seeks individual with manufacturing or industry experience and DEC 11/70 or VAX using BASIC. Experience with NCA package helpful. To mid \$30's

CICS SYSTEMS PROGRAMMER

Seattle firm seeking tech support analyst with 2-4 years IBM DOS/VSE internals experience and strong CICS background. Good spot for someone looking for more responsibility. To \$40,000

MVS SYSTEMS PROGRAMMER

Seattle firm seeks individual with 5-6 years IBM MVS internals experience and thorough knowledge of VTAM and NCP. Large firm which offers exciting technical environment and opportunity for advancement. To \$40,000

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Major division of billion dollar corporation located in S Florida, actively seeking DP Professional. Your background must include 4 years minimum performance and tuning experience in a large multiple IBM-MVS environment. Large scale on-line systems such as IMS is desirable. Outstanding career opportunity. Relo paid. Fee Paid. Salary to \$48,000

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St. Louis-based service organization has a need for an experienced Hogan individual to manage a project team working with the Loan System module of Hogan. Excellent benefits. Salary to \$37,000

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Industry leader has a very good opportunity for a 2+ yrs Programmer Analyst with experience in a large OS/ MVS shop environment to take on a variety of applications in manufacturing and business systems. Salary to \$30,000

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CT hi-tech client seeks indiv to direct Real Time sys, PCB assembly & all electronics mfg apps. Mini computer exp pref. Salary to \$45,000

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Top DP position w/CT mfr for indiv w/min 10+ yrs mfg bkgrd to direct lge staff in IBM-DOS/VSE, CICS shop. Exp w/IBM TP prods, COPICS sftwr highly pref. Salary to \$60,000

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Software professional to generate, remotely install, and support the VM operating system on a networked system of IBM 43XX computers. Requires knowledge of IBM 370 Assembler Language, VM/370, RSCS Networking, Pass Thru, and VMAP.

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Consulting and Contract Programming throughout the Southeast for nine years, DRC offers competitive salaries including bonuses and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company that "puts people first" DRC is your answer. Send resume to: 3301 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call: BECKY FINLEY or JIM BARRETT at: 404-455-7260 or toll free 1-800-241-6002

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With a background in IMS, Data Dictionary and Structured Analysis. Individual should be experienced in human factoring. Salary to high 30's.

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- Sr. Systems Programmer with 4 or more years experience.
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Both applicants should have supportive knowledge of VM DOS/VSE, CICS, VTAM, NCP, and Assembler in an IBM 370 environment.

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- 3 to 5 years experience in on-line environment.
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We are a DOS/VSE shop migrating to MVS in 1985. MVS experience would be considered a plus in all of the above positions.

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Two years experience as Programmer Analyst in major on-line systems environment, Command Level CICS, COBOL, Data Base, and IBM 43XX or 3XXX Series experience are requirements. DL/1, V/M, DOS/VSE and college degree are desirable. Candidates must show initiative, possess good communication and strong leadership skills, and desire working in an on-line systems environment with opportunities for growth. Experience acquired in a manufacturing environment is preferable.

PROGRAMMER ANALYST

Two years programming experience, Command Level CICS, COBOL, and IBM 43XX or 3XXX Series experience are requirements. DL/1, V/M, DOS/VSE and college degree are desirable. Candidates must show initiative, possess good communication skills, and desire working in an on-line systems environment with opportunities for growth. Experience acquired in a manufacturing environment is preferable.

If you are interested, please send a resume in confidence to the Personnel Department at:

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Participate in the design, development and testing of current and future products. May assume responsibility for source control systems. Requires 5 plus years in support or development of 370 operating systems. Assembler language coding experience mandatory. Experience with VM/SP systems desirable.

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We are seeking a Sr. Systems Programmer to support VM/SP and related software. If you have a minimum of 4 years VM systems programming experience, including installation, maintenance, VM internals, and strong diagnostic skills, plus experience in Assembler language coding, you may qualify for this position.

Staff MVS Systems Programmer

Perform problem determination, installation and maintenance activities for a JES2 MVS operating system as well as propose and implement state-of-the-art software enhancements to improve service and productivity. Provide technical leadership in software-related projects and planning efforts in the Corporate Computer Center. 7 years MVS systems programming experience with in-depth knowledge of at least one major subsystem and strong diagnostic skills may qualify you for this position.

Staff Systems Programmers

Responsible for implementing enhancements to a highly modified VM operating system which will be used to simulate future products. This position could also involve building a new simulator. Requires 5 plus years VM experience to include internals, externals, and maintenance. Assembler language coding experience mandatory.

Staff Systems Programmer

Play a major role in a key development project, including development of Multiple Domain Facility and related functions for future products. Requires 8 plus years experience in systems development with in-depth knowledge of 370 architecture.

Staff Systems Programmers

Participate in the design, development and testing of a key development project. Assume responsibility for existing code for 370 and XA mode recovery. Design and implement recovery enhancements for future products. We require 5 plus years experience with IBM 370 Architecture, Assembler language, thorough knowledge of MVS Recovery, channel and machine check handling.

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Responsible for detailed design on an Advanced Storage Control Unit. Hardware logic design prin-

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Responsible for detail design and programming of a control microprocessor within an Advanced Storage Control Unit. Requires 5 plus years of design-related experience using micro-programming techniques for microprocessor controlled hardware units.

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Generate and maintain MVS system software to support Amdahl's storage products. Develop MVS based software to enhance the products and ensure compatibility. Work with hardware development engineers to develop stress test cases to be used for Amdahl's storage product line. Requires 5 plus years experience with MVS internals, and an in-depth knowledge of I/O operations.

To explore one of the opportunities in the Corporate Computer Center, The Peripheral Products Division or Product Development, contact Kim Hawley Toll FREE at 800/538-8460, extension 7171. In California, call COLLECT at 408/746-7171.

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Software Instructors

Develop courses for 580 software in MVS, VM, TP, and IMS. You'll be responsible for both lecture and lab. Requires a minimum of 6 years industry experience; strong operating systems knowledge in VM or MVS; and good leadership skills. Training experience desirable but not mandatory.

To explore this opportunity contact Bob Tyler TOLL FREE 800/538-8460, extension 6190. In California, call COLLECT at 408/746-6190.

Or send your resume to Kim or Bob at Amdahl Corporation, Dept. 12-002, MS-300, P.O. Box 3470, Sunnyvale, CA 94088-3470. We are an equal opportunity employer through affirmative action.

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- Computer Security
- Data Systems Analysis
- Data Base Systems Design/Development
- Decision Support
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Senior Scientific Programmer

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WYOMING UNIVERSITY COMPUTER SERVICES

The Division of Computer Services at The University of Wyoming provides a broad base of hardware and software services and support for both academic and administrative computing. Computer Services also administers the central computer facility which houses an IBM 4361, a CDC Cyber 760, a CDC Cyber 835, a VAX 11/785, as well as several minicomputers. In support of this activity, the following position is available for immediate hire:

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Supports the administrative computing effort in a senior systems role. A primary function is to maintain and enhance the MVS-SP/CICS system and to advise administrative users. A secondary function is backup support for NOS, VMS, and ULTRIX operating systems. Works closely with programmers in the Systems department and administrative application programmers. Candidate must have B.S. in Computer Science or related field. Four years of system programming plus good oral and written communication skills are required. Experience with IDMS and other systems already mentioned are a plus. Salary range is \$24,000 to \$36,000, commensurate with experience.

Qualified candidates should forward their resumes, current salary and three references with telephone numbers to William B. Jones, Computer Services, P.O. Box 3945, University Station, Laramie, Wyoming, 82071.

The University is an Equal Opportunity/
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Director of Software Development

Dynamic software company in the Southwest needs an exceptional manager to direct its mainframe development activity. Environment is IBM IMS and CICS under MVS.

Product line is state-of-the-art; the staff is top quality and the working environment close to ideal.

Your background should include technical familiarity with IMS and at least five years experience in IBM mainframe software development management.

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You should have 2 to 3 years of Data Security experience, and the ability to work with all levels of management. Thorough knowledge of bank and data processing operations, and complete knowledge of RACF, MVS External and some MVS Internal are required. Some management experience and knowledge of IMS and CICS are preferred.

Discover the advantages of Florida living with unlimited recreational opportunities and no state income tax. If you'd like to combine your career with our easy Orlando lifestyle, please send your resume in confidence to: Sunbank Service Corporation, Jim Madden, Dept. CW, 7200 Lake Ellenor Dr., Orlando, FL 32809.

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INFOREM II SR. PROGRAMMER/ ANALYST

- San Francisco Bay Area -

Lucky Stores, Inc. is one of the largest retailers in the nation, with over \$8 billion in annual sales from diversified stores in 29 states.

We are seeking a senior-level Programmer/Analyst to assist in the installation and customization of IBM's Inforem II, which will support buyer forecasting at our various divisions. We require previous experience installing Inforem II and knowledge of CICS/DMS. Experience with IMS/ADF is helpful.

We offer a competitive salary and benefits package. Please send your resume, including current salary to Suzanne McFadden, LUCKY STORES, INC., MIS Systems Support (CW14), Box BB, Dublin, CA 94568. (415) 833-6534. Relocation assistance may be provided. We are an equal opportunity employer. Individuals only apply.

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ARCHITECTURAL PLANNER

At GTE Data Services, we've blended a team approach with an entrepreneurial spirit to reach new heights in customer-focused technology.

We are in need of an Architectural Planner to define and lead the establishment of an architecture for integrated telecommunications, DP and office product networks. Requirements include:

- ▶ Minimum of 15 years experience in telecommunications, DP, large networks and office automation
- ▶ Knowledge of network theory, data-base techniques, PABX's and fault tolerant computers
- ▶ Excellent managerial and project leadership skills
- ▶ PhD in Engineering, Computer Science, Math or equivalent

GTE Data Services, a subsidiary of GTE dedicated to Information Management, offers the challenge of a lifetime, the rewards you deserve and relocation assistance to our Florida Gulf Coast location.

Please submit resume with salary history to: N. Fitzpatrick, Dept. CWD, GTE Data Services, P.O. Box 1548, DC 136, Tampa, Florida 33601. An equal opportunity employer.

GTE Data Services

DATA PROCESSING UNIVAC PROFESSIONALS

We have opening in our MIS area requiring personnel with Univac 1100 experience in a medium to large installation, knowledge of COBOL, TIP, DMS and MAPPER, with a BS degree in Business Administration desirable.

SYSTEMS SUPERVISOR

Minimum of 6 years experience with 2 years technical supervision required in manufacturing, purchasing and accounting systems desired for this position in the Operation Application Development area. Must possess excellent communication skills.

SENIOR ANALYST PROGRAMMERS

Minimum of 6 years experience with manufacturing systems. MAPPER experience desirable but not required.

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Tenure-track position as Assistant/Associate Professor of Computer-Aided Architectural Design. This position supports the Department's commitment to developing computer graphics beyond drafting aids into design and architectural modeling tools and combines research and teaching in this area. Emphasis is on preparation of students for professional practice. Candidate selected will also be involved in Project Athena, MIT's \$70 million dollar experiment in computer-assisted education. Qualifications include strong architectural design ability and experience; BA/Arch or MA/Arch degree minimum; expertise in designing with computers, including familiarity with database structures and microprocessors. Experience in teaching and in software development related to computer graphics and advanced programming techniques desirable. Resume and references to Professor John R. Myer, Head, Department of Architecture, MIT, 77 Mass. Ave., Cambridge, MA 02139 USA by March 15, 1985.
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Requires a strong technical manager to guide the design, maintenance and control functions of a large database system. Provide short and long range direction and set standards for developmental and use of data within a large volatile information system. Manage a small staff of systems professionals and have 5-7 years experience managing a data base environment. Knowledge of ADABAS helpful but not necessary.

MANAGER, NETWORK SYSTEMS SOFTWARE

Responsibilities include the management, direction, and control of the implementation of systems, programming, equipment and procedural changes to the Data Center production and test on-line environment. In addition, the direction and control of any and all changes to the on-line environment with systems, programming, and computer operations. Candidate must have strong background in VTAM, NCP, NCCF, NPDA, and CICS. College degree and 5-10 years experience preferred.

MANAGER, SYSTEMS SOFTWARE

Responsible for the Development and maintenance of systems software in a large-scale IBM facility under MVS-JES2. Also responsible for support of System Development monitors and third-party system support packages. Position manages a small staff of systems professionals in a rapidly expanding environment. A successful candidate should have 7-10 years IBM Systems Software experience with 3-5 years in a management capacity.

COMPUTER OPERATIONS MANAGER

Responsibilities include the management of 4 computer operations shifts engaged in operational management of a large, multi-CPU, MVS operating system supporting TSO, JES2 and a CICS on-line system with approximately 2500 terminals. Responsible for a 24-hr./day, 7 days/week data center while providing direction and assistance to the Operation Shift Managers as well as to provide support for Production Control, Network Services, Systems Programming and Data Processing users. A college degree and 5-10 years experience preferred.

COMPUTER OPERATIONS SHIFT MANAGERS

Responsibilities include the management of a computer operations shift engaged in operational management of a large, multi-CPU, MVS operating system supporting TSO, JES2 and a CICS on-line system with approximately 2500 terminals. Responsible for the management of the activities of MVS console, tape and printer pool operators. Position reports to the Computer Operations Manager. A college degree and 2-5 years experience preferred.

PRODUCTION CONTROL MANAGER

Responsibilities include the management of the Production Control Department consisting of input, output, tape library and scheduling sections. Manage overall activities of staff members working a 24-hr./day, 7 days/week schedule engaged in data preparation, input job setup, scheduling, output distribution and control functions as well as coordination of efforts among Computer Operations Management, Technical Support Management and Programming Management. Candidate must be familiar with all facets of computer operations, input/output medias, control techniques and be highly attentive to detail. A college degree and 5-10 years experience is preferred.

MVS CONSOLE OPERATORS

Responsibilities include the operation of a systems console in a large IBM 308X multi-CPU OS/MVS operating environment. Individual should have a minimum of 2 years hands-on experience with CICS, JES2, TSO and SDSF.

PRODUCTION CONTROL OUTPUT UNIT MANAGER

Responsibilities include the Management of the Production Control Output Unit in a 24-hr./day, 7 days/week operating environment. Responsible for the quality review and timely distribution of computer generated reports to the Data Processing user community. Coordinates overall efforts with computer operations in the procedures to control, reconcile, and distribute output in accordance with departmental standards. Candidates must be attentive to detail and highly motivated. College degree and 2-5 years experience preferred.

SYSTEMS PROGRAMMERS

Responsibilities include the generation, testing, implementation, and performance tuning of computer software in the areas of MVS, CICS, VTAM, and NCP. Individual will be required to install changes to operating system software and assess and document the impact of those changes to application programmers and operations personnel. Responsibilities will also include providing technical expertise to all areas of the Data Center. A college degree and 2-10 years experience preferred.

TECHNICAL ASSURANCE ANALYSTS

Responsibilities include the coordination, control, and implementation of all system, programming, equipment configuration and procedural changes to the computer operations environment. Requirements include knowledge of OS JCL, library update procedures, use of TSO and IBM utilities and disk allocation methodologies. College degree and 2-5 years experience preferred.

OPERATIONS SUPPORT ANALYSTS

Responsibilities are to provide computer operations with operations support. Individual will perform problem determination on all production-related job abends. Individual must have a minimum of 1-2 years experience and have a good working knowledge of OS JCL and restart procedures.

PRODUCTION CONTROL INPUT UNIT MANAGER

Responsibilities include the management of the Production Control Input Unit in a 24-hr./day, 7 days/week operating environment. Responsible for the data preparation, input job setup, and staging of scheduled batch work to Computer Operations. Managing the daily application setup activity in accordance with department standards and procedures as well as coordinating efforts with operations and systems support functions. Candidate should be familiar with all facets of computer operations, have a JCL background, attentive to detail and be highly motivated. College degree and 2-5 years experience preferred.

NETWORK OPERATIONS MANAGER

Responsible for the planning and maintenance of on-line system availability for a major SNA network consisting of 2000+ terminals supported by large-scale IBM 308X multi-CPU's running CICS, ACF/VTAM, ACF/NCP. Responsible for performing continual system and network monitoring, perform problem determination and implement remedial action. Must be experienced in the development and implementation of a network control center consisting of a major patch panel complex, datascopes, oscilloscopes and Bradley instruments. College degree and 5 years management experience in this environment is preferred.

NETWORK OPERATIONS ANALYSTS

Responsible for the continual monitoring of on-line system availability for a major SNA Network consisting of 2000+ terminals. Responsible for performing continual system and network monitoring, perform problem determination and implement remedial action. CPU mainframes are IBM 308X running MVS, CICS, ACF/VTAM, ACF/NCP, NCCF and NPDA. Should have 1 year experience and be familiar with patch panel, datascopes, oscilloscope, and Bradley instruments.

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Responsible for systems analysis & programming for business applications. Bachelor's Degree (experience may be substituted) and two (2) years programming/analysis experience. Knowledge of Assembler, COBOL, DLI, CICS, Easytrieve, and DOS/VSE.

SYSTEMS PROJECT LEADER

Bachelor's degree or equivalent. Training in systems analysis, project management, business communications and management information systems is required. Six (6) years work experience required including data processing and project planning or supervision. Interest in working with severely physically disabled adults preferred.

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Computer service bureau in the direct mail business has an opening for a computer room operations manager with large mainframe MVS experience. DOS experience a plus. Looking for a hard (shirt sleeve) worker with proven management experience and good administrative skills. Current hardware AMDAHL 470/V8 with planned second quarter 85 migration to XA. Minimum 5 years operations management experience. Excellent salary, bonus plan and benefits program. If you are interested in a city job with country living, Fredricksburg, Virginia is just an hour from both Washington, DC and Richmond and an ideal setting for family living, please send resumes to:

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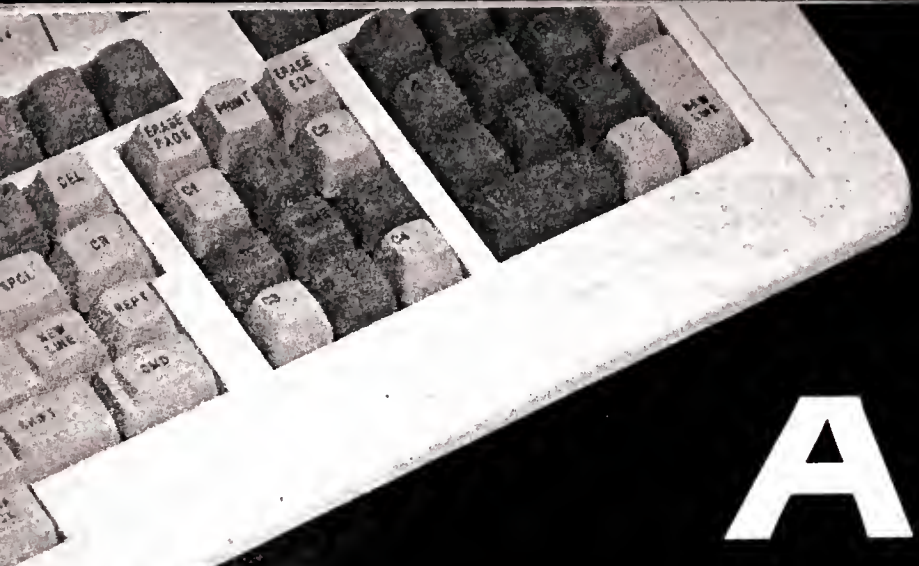
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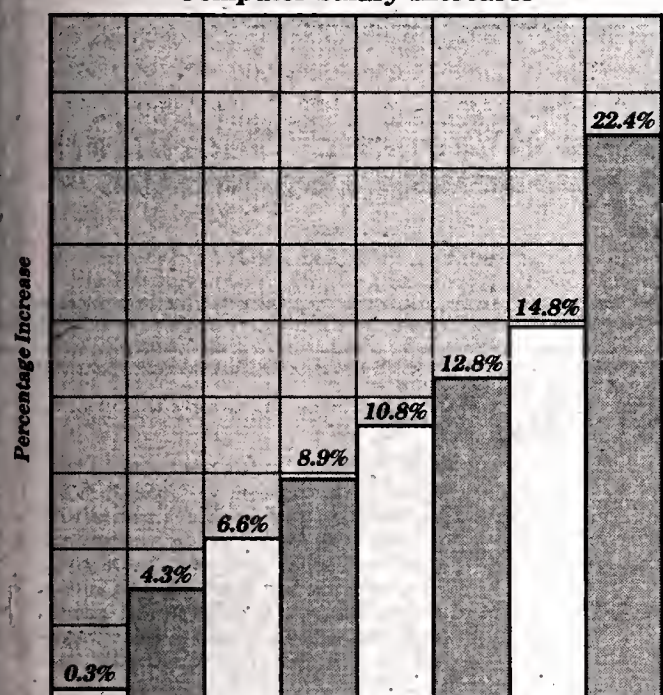
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Computer Salary Increases**



Selected Computer Positions

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A program to help you progress

In addition, the new Survey includes a number of comprehensive charts, exhibits and graphs which are designed to help you gain a thorough understanding of emerging industry and career trends and what you could do to capitalize on them. Through documented case studies, you'll also learn why some computer professionals advance while others do not—despite the positive economic outlook.

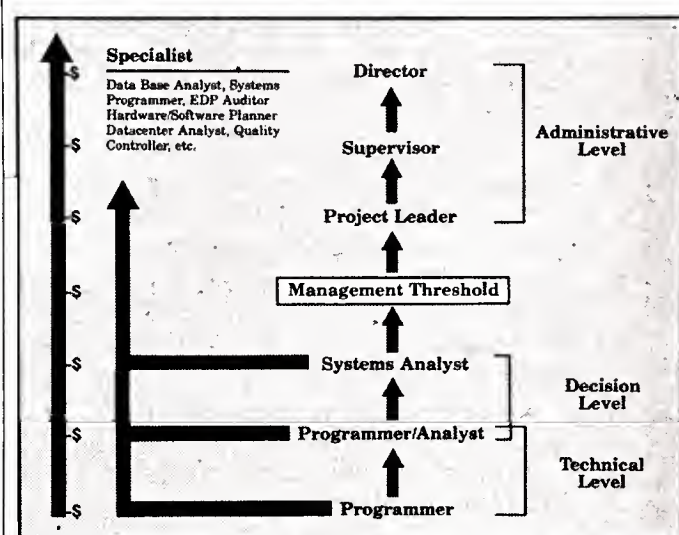
Included is a seven-step career planning system that can help you assess your current position and take corrective action when and if needed. This is a unique system that Source Edp developed and refined over the last twenty-three years, which has helped thousands of computer professionals advance in their careers.

Free to computer professionals

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"Solving The Hard VM Problems"

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IMS Systems Programmer/Analyst required. Will be responsible for software and hardware evaluation of computer systems. Will be working with IMS environment using TSO & BTS software systems and JCL and PL-1 programming languages. Applicant must possess Bachelor's degree in engineering or computer science and 2 years prior experience with PL-1 programming and must be familiar with TSO, BTS, JCL and large scale IBM mainframe computers. Minimum salary to be \$25,000 per year for a 40 hour work week, however, additional salary up to \$38,000 per year will be paid for additional experience. Interested applicants should contact The Oklahoma Employment Security Commission, 3105 East Skelly Drive, Tulsa, Oklahoma 74105. Phone: (918) 749-6861. Refer to job order #090544.

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DIVISION OF UNIVERSITY COMPUTING

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RESPONSIBILITIES: The Director reports to the President's office, and has primary responsibility at the policy level for the planning and delivery of the information, computing, and digital communications systems and services which support the diverse administrative, instructional, research, and extension activities of Auburn University.

QUALIFICATION: Applicants must have demonstrated: the highest level of competence in management, planning, and budgeting for large-scale research, instructional, extension and administrative programs; a thorough familiarity with financial, student, human resources, and other data base systems at both operating and policy levels; a thorough familiarity with current products and vendors of both hardware and software; and the ability to communicate and work effectively with diverse groups of administrators, faculty, and students. Applicants must have appropriate advanced degrees or equivalent experience.

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Professor Jack W. Rogers, Jr.
Search Committee for Director
Division of University Computing
Mathematics Department
Auburn University, Alabama 36849

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You'll need creative insight and the initiative to get things accomplished in this key position. You will help select our advertising agency and work with them to define, implement and coordinate the marketing communication program. Your responsibilities entail the complete range of marketing communications activities including product brochures, sales support and promotion literature, and industry show coordination. This is an opportunity to make a creative contribution in a high growth environment. Strong background in advertising and sales support with a technical company essential; agency experience a plus.

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Use your industry expertise to market the capabilities of our product and organization with identified segments of the scientific and engineering computer marketplace. Additionally, as the internal expert, you will interpret market needs, establishing CHI policies for pricing competition, distribution and overall product strategy. 5-8 years industry experience in the scientific/engineering computer business addressing such specialized segments as CAD/CAM.

EXECUTIVE SALES PERSONS

Do you have 4 or more years proven sales experience? ... market knowledge of the scientific/engineering or computational market from an applications perspective? ... the technical knowledge and background needed to compete in this volatile market?

Are you interested in a company that values quality, added value and integrity? Are you interested in a commission plan that rewards all of the above? Then, why haven't you contacted us?

CHI Systems offers industry competitive compensation and an exciting arena to explore your own potential. For more information on these career opportunities, please send your resume to A. Riederer, CHI Systems, 100 Burns Place, Goleta, CA 93117. We are an equal opportunity employer.

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CHI Systems

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We seek an aggressive individual to sell a new state-of-the-art, on-line, data base management system to fund-raisers and direct marketers. Extensive computer sales background required. Direct mail marketing experience helpful.

We are a progressive Boston (Route 128) company, leaders in our field, specializing in commercial and non-profit direct marketing. To the successful candidate we offer liberal fringe benefits and above average salary based on experience. Small company atmosphere.



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EG&G Idaho is about as close as you may ever come to both an exciting place to live and work. Not only could you be where your individual and technical abilities are recognized, but because we're a prime contractor to the Department of Energy's Idaho National Engineering Laboratory, you'll be helping us ensure a safe and plentiful supply of energy for all of our futures.

Plus, you'll be in an extensive and highly sophisticated technical environment located within easy access of cities, recreation spots and one of the last true wilderness areas in America.

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This position involves a number of challenging duties and tasks related to providing technical support of VAX 11/750. Among the responsibilities are maintaining VAX 11/750, UNIX operating systems as well as ensuring OS integrity and compatibility through configuration and change control procedures. You will implement security requirements through access, backup and recovery mechanisms. Provide VAX 11/750 resource utilization reporting and user accounting. Develop disk space management procedures and support capacity planning. Serve as Systems Manager and accountable technical contact for vendor support. Consult with systems users to improve service and resolve problems.

You must have three years or more of experience with at least one year with UNIX OS. A BS degree in Computer Science along with a knowledge of OS principles are also required.

We seek resumes from all qualified individuals. Minority candidates are encouraged to apply. For consideration, send your resume to: **Staffing and Development (BD 19), P.O. Box 1625, Idaho Falls, Idaho 83415.** U.S. Citizenship Required.

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Litton Computer Services, a division of a Fortune 100 company, is one of the nation's leading data processing organizations, an independent computer services company, innovative and responsive to the needs of both government and private industry. We operate the latest IBM CPU's (we have a 3084, 3081 and a 4431) and equipment, and are running MVS/XA. Due to our exceptional growth rate and aggressive expansion, we have an excellent opportunity available.

Required experience includes tuning, performance and capacity planning knowledge, with a minimum of 3 years experience in an MVS/SP environment using a combined knowledge of RMF OMEGAMON, DEXON and CMF. BS in Computer Science is necessary, however applicable work experience may be substituted. Prior systems programming experience also required.

Litton Computer Services is conveniently located in Woodland Hills, where you can enjoy an incomparable climate and the relaxed atmosphere of suburban Los Angeles living as well as easy access to one of the nation's largest metropolitan areas. In addition, we offer the chance to work with the latest state-of-the-art equipment, a complete benefits package, and a friendly atmosphere conducive to both personal and professional growth. If you would like to join an aggressive, growing organization, send resume with SALARY HISTORY to:

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I specialize in the placement of HP-3000 Analysts and Programmers and have numerous opportunities across the country for professionals with this experience. Our client companies include both small and large end-users as well as software development firms specializing on the HP-3000. Experience with manufacturing or financial applications is particularly desirable.

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We are seeking an individual to provide leadership in planning, organizing and directing all activities of a major application development effort. Minimum three years systems analyst and two years programming experience. The successful candidate must have management potential, IBM 4381 experience and knowledge of Cobol, CICS, PL/I, DOS/VSE, VM and VSAM. Prior experience in major financial systems conversion desirable. We offer an attractive benefit package as well as a very competitive salary. Interested candidates should submit resume and salary history to:

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Even though we are a recruiting firm, we do offer a free resume service. Write or call for a resume preparation form. Complete the form and mail to us and we will return a completed resume to you... This is a confidential service with no obligation.

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If you have at least two years of experience in VM/CMS, DOS/VSE, MVS/XA, COBOL, DL/1 or CICS command level in an IBM environment, we'd like to speak with you. We are seeking data processing professionals who possess experience with marketing, finance, retail, manufacturing and/or software systems.

So, if you're highly talented with the motivation to match, we will offer you an environment with intriguing applications, unparalleled challenges, and diversified career growth. Just send your confidential resume, with salary history, requirements and position preference, to: **Box DDC 221, 350 Fifth Avenue, Suite 3920, New York, NY 10118.** We are an equal opportunity employer M/F/H/V.

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- 5: DATA BASE ADMINISTRATORS
- 6: COBOL, CICS, MVS, IMS DB/DC, TSO/SPF
- 7: COBOL, IDMS, MVS, TSO/SPF
- 8: DATA ANALYST, IBM DATA DICTIONARY

We offer paid relocation, excellent benefits and salary commensurate to experience.

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Personnel Director

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Vice President for Academic Affairs
Northern Montana College
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AA/EOE

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If you are ready for a professional environment, investigate your potential with Informatics General Corporation. Our unique operating philosophy is captured in two brief booklets which we will share with you during an interview. The concepts described have enabled us to build and retain a superb staff of over 2800 fulfilled career professionals and 22 years of prosperous, uninterrupted growth.

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Requires minimum 5 years' background designing computer application software, and minimum 2 years with legal office automation financial and accounting software systems. Ideal experience would be consulting for Big 8 accounting firms or similar, and developing systems suited to meet their needs. **Phoenix based.** Relocation costs covered. Maximum 30% travel.

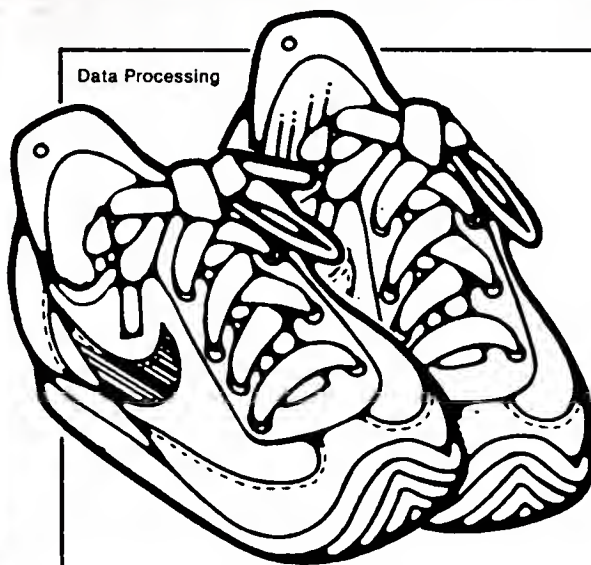
PROJECT LEADER

You'll need 8+ years of software applications development with 2 of those years as software development project leader. COBOL programming skills essential. One position requires experience with legal information processing and word processing system development; one requires experience developing legal, financial and accounting systems. We prefer that some of your experience is with a software vendor. **Phoenix based.** Relocation costs covered. Maximum 10-15% travel.

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COBOL programming skills and 3+ years' application development experience required. Experience with financial and accounting applications system development or word processing system development for the legal community required. **Phoenix based.** Minimal travel required.

For immediate consideration, please send your resume stating position of interest in confidence to: **Employment Manager, INFORMATICS GENERAL CORPORATION, 2111 East Highland, Suite 400, Phoenix, Arizona 85016.** An Equal Opportunity Employer.



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To provide IBM mainframe users with the most sophisticated and advanced software products available, we are expanding our Product Development teams and beginning several major products which will impact the future of data processing.

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In addition to at least 5 years BAL programming (PASCAL a plus), expertise with some or all of the following areas could qualify you to join one of our talented development teams.

- OS/MVS or VM Operating System Internals.
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We provide competitive salaries and benefits (relocation available if required), and a unique opportunity for a career with an industry leader. If you are ready to step into one of these key positions, please send your resume in confidence or call: **S. Worthy, Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521, 1-800-323-2201.**

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We look for people who place the same emphasis we do on excellence and results. In turn, we provide an open, participative style; competitive salaries; and attractive benefits, including fully paid insurances, relocation assistance, stock participation and sabbatical leave.

CRA is headquartered and operates in the Harrisburg, PA area, the State's capital. This Southcentral PA region features a moderate climate, reasonable cost of living, excellent schools and a wide variety of recreational facilities.

Our assignments are mainly in Central PA, however we also have openings in New York City and the Mid Atlantic area.

If you qualify, call Ken Podd at (717)737-4810, or write to:

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All replies will be treated in strictest confidence, and all replies will be answered.

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At Wheat you will have the opportunity for responsibility earlier in your career...and a broad range of assignments. You will work independently, from your private office, making direct contact with managers as your assignments require. Your achievements will be highly visible and recognized.

You will be joining a growing data processing staff in the dominant brokerage securities firm in Virginia, and a leading financial services firm in the East. The Wheat data processing professionals support a full range of financial products and services through a 750-terminal network using a current operating environment of two IBM 4341's, MVS, TSO, TCAM and CICS; with plans to upgrade to an IBM 4381 in the near future.

If you have 2 years of programming experience using COBOL, a working knowledge of MVS/JCL and IBM hardware exposure, call **Jane Bailey, Personnel Representative, (804) 782-3323** or send her your resume at 20th Floor, 707 East Main Street, Richmond, VA 23219.

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Send resume and salary requirements in confidence to: **Craig A. McCall, Summa Corporation, P.O. Box 14000, Las Vegas, Nevada 89156.** equal opportunity employer



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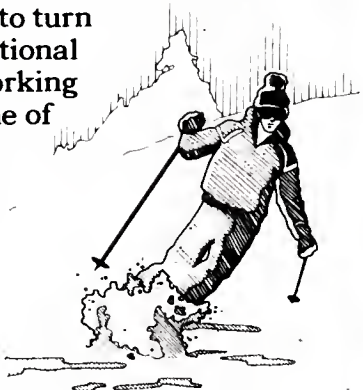
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You need Model 204, IBM 43XX background, 1 to 4+ years' experience and U.S. citizenship. Experience in one or more of the following desirable: intelligence data handling systems, intelligence related contract, DODIS network architecture, automated message handling systems (AMHS) — either MAXI, PDSC or CSP.



For immediate consideration, please send your resumé in confidence to: **Planning Research Corporation, Government Information Systems, 1500 Planning Research Dr., Dept. JA-35, McLean, Virginia 22102.**
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Planning Research Corporation

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Perform applied research & development in integrated switching, token ring, CSMA/CD, broadband & baseband local area networks. Evaluate computer network performance. Develop network interface devices for networking various kinds of computer systems. Develop mathematical tools for analyzing network statistics. Develop network service and management packages. Carry out research on inter-network long-haul communications. Compose technical reports for research results and provide consultations toward the goal of a nationwide computer network for all corporate data communication operations.

Minimum Requirements: Ph.D. in Electrical Engineering. Strong background in data communications, expertise in local area networking, and knowledge of modeling, statistical analysis and delay/collision prediction, as evidenced by (1) graduate-level course work (one quarter) in each of the following subjects: data communication networks, advanced topics in communication theory, stochastic process & communication theory I, stochastic process & communication theory II, and by (2) completion of a doctoral dissertation on integrated switching telecommunication networks, both long-haul and local area.

Salary: \$42,000 per year. Basic 40-hour work week plus benefits typical of the industry.

Apply at the Texas Employment Commission, Houston, Texas, or send resumé to:

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TEC Building

Austin, Texas 78778 (J.O. #3661165)

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SYSTEM SOFTWARE SPECIALIST

\$2171 - \$2773 per month. Performs duties in the evaluation, installation, and maintenance of all systems software for IBM 4381. Four years experience in software maintenance and installation in an IBM VM/VSE, CICS environment or an equivalent combination of experience and training. For application contact:

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Roseburg, Oregon 97470

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COMPUTER - Berea College is seeking an Instructional Computing Coordinator in a twelve month administrative position with some teaching responsibilities, beginning July 1985. Candidates should have experience using the computer in the classroom, knowledge of microcomputers, keen interest in teaching, and be conversant in BASIC and PASCAL. A Masters in computer related field or Masters and three-four years experience in the instructional use of the computer is required. Berea is a Christian, liberal arts college of 1525 students and actively seeks applications from minorities and both sexes. PRIME 400 and Micro-labs. Send resume, statement of interest, and names of at least two references to: Director of the Computer Center, CPO 2293, Berea College, Berea, Kentucky 40404.

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If you are looking for an opportunity to be responsible for our newly installed S/38, if you want growth and recognition for your ideas and work—read on. Our 8 year old firm in the Virginia suburbs of Washington, D.C. is looking for a dynamic manager that wants to be an important part of the coming years of growth. Along with RPG III experience, you should be strong in system analysis and have demonstrated the ability to organize and maintain a small but highly efficient DP Shop.

Send resume with salary history to: Box #CW-B4130, Computerworld, P.O. Box 880, Framingham, MA 01701

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Software Engineers wanted for development of telephone systems software.

Applicants must have 3-7 years experience with call processing and/or data base management software for digital telephone switches.

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Analyze user needs for new student database system. 2-3 years programming and/or analysis experience and degree required. IDMS, VM, CMS helpful. Submit resume and 3 references no later than 2/28/85, to: Martin Cohen.

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EO/AA Employer M/F

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Knowledge of Local Area Networks or SNA and some teaching experience required.

Excellent compensation some travel, full or part-time.

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Blue Cross Blue Shield of Greater New York, a progressive organization in the health care field, is rapidly expanding in the data processing area. As a successful growing organization, we are seeking a talented and highly motivated individual to lead technical personnel to ensure that company information processing goals are achieved efficiently. Our data processing environment consists of an IBM 370/3081 mainframe using OS/MVS, VSAM, CICS, TSO/SPF. This newly created position is available in our New York Blue Cross Medicare operation located in Syracuse, New York.

The incumbent will be responsible for managing systems development activities and staff for work being performed on a statewide Medicare claims processing system.

The successful candidate must have held progressively responsible positions in a large IBM mainframe environment with at least 8 years of data processing experience in the areas of systems design and programming, and at least two years experience at the management level. Experience in an insurance environment is highly preferred. Medicare experience would be ideal, and a baccalaureate degree in an appropriate field is desired.

We are offering a competitive salary and an excellent package of company-paid benefits. For immediate consideration, please send your resume or letter with salary history to:

NEW YORK BLUE CROSS MEDICARE

Human Resources
518 James Street
Syracuse, NY 13203

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Auburn University is seeking a highly qualified individual to serve as Data Base Administrator.

RESPONSIBILITIES: This position reports to the Director of the Division of University Computing, the centralized computing organization within the university. The duties of this position include planning, designing and implementing data base systems using the TIS DBMS from Cincom Systems. The DBA will also develop standards and procedures to ensure the integrity and security of the data base, and will assist the application development staff in implementing integrated systems in a data base environment.

QUALIFICATIONS: A Bachelor's degree in an appropriate discipline is required; a Master's degree is desired. Applicants should have a minimum of three years experience as a Data Base Administrator, preferably with a major DBMS on IBM systems in a university environment. Strong interpersonal and communication skills, and the ability to effectively interact with all levels of management are attributes the applicant must possess.

COMPENSATION: An excellent salary, commensurate with experience, and a liberal fringe benefit program are offered for this position.

AUBURN UNIVERSITY was chartered in 1856. The main campus, with an enrollment approaching 19,000 students, is the largest single campus in the state. Auburn is a land grant university with a broad base of programs in the liberal arts, sciences, and professional areas, and a strong commitment to graduate education and research. It is located near the border of Alabama, 50 miles from the capital, Montgomery, and just over 100 miles from Atlanta, GA.

APPLICATIONS: The closing date for applications is March 1, 1985. Applicants should submit a letter of application, a current resume, and the names, and phone numbers of three references to:

Bruce R. Lewis, Acting Director
Division of University Computing
144 Parker Hall
Auburn University, Alabama 36849-3502

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Software Engineer (Dayton area) to design and program interfacing for avionics integration support facility, test and analyze software validation and verification network. Will modify software systems utilizing the VAX 11/780 VMS. Requires Bachelor's in Computer Science with one year software programming experience. Experience must be with utilization of VAX 11/780. 40 hour week 8AM to 5PM. Salary \$19,800 per year. Send resume and ad to:

Ohio Bureau of Employment Services
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Attn: L. Ellison
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DIRECTOR RESOURCE AND PLANNING DATA SYSTEMS

UNIVERSITY OF ILLINOIS AT CHICAGO
University of Illinois at Chicago currently seeking Director or evaluation, planning, and implementation of budgetary, staffing, facilities and other related data systems used through out the campus. Candidate should possess masters degree in relevant field, extensive knowledge of and experience with data systems used within higher education, demonstrated management ability. Mainframe used on the campus include the IBM 3081, 3081A, 3081D, 4331, 168, and Amdahl V8. Salary is competitive. Letters of application detailing experience and equipment familiarities and resume with names of three references to: T. Olsen (m/c 102), Office of Planning and Resources Management, 2715 University Hall, P.O. Box 4348, Chicago, IL 60680, (312) 996-6210. The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

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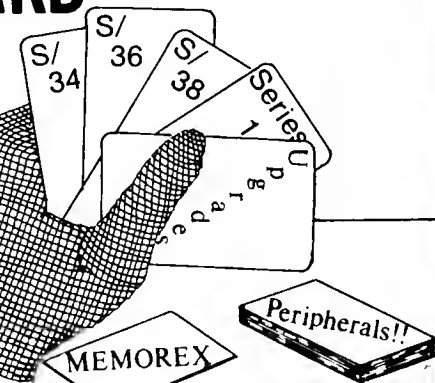
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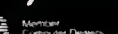
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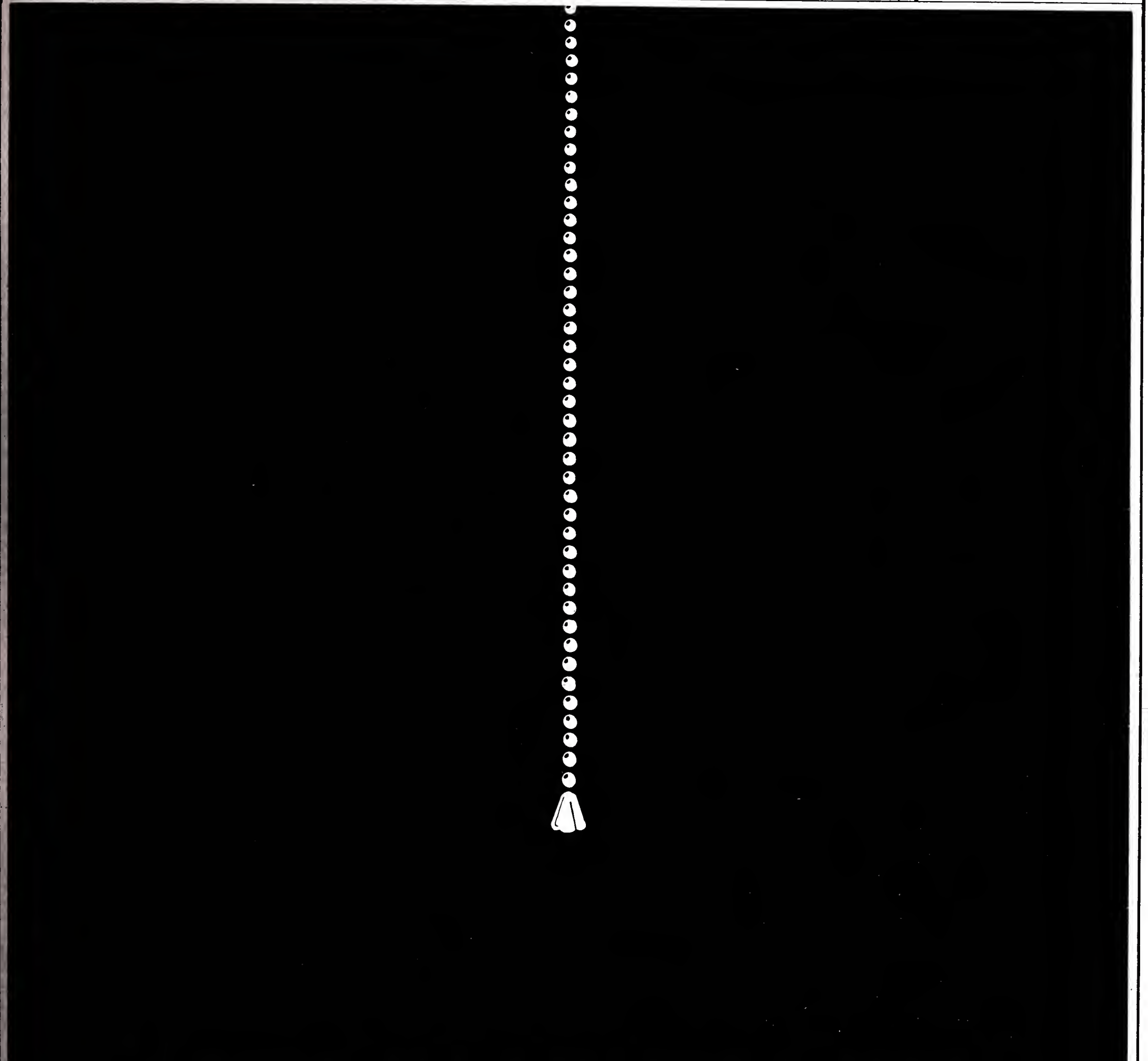
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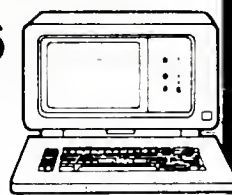
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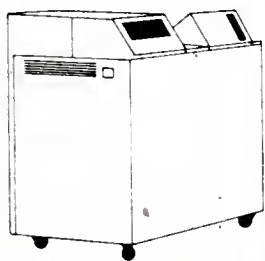
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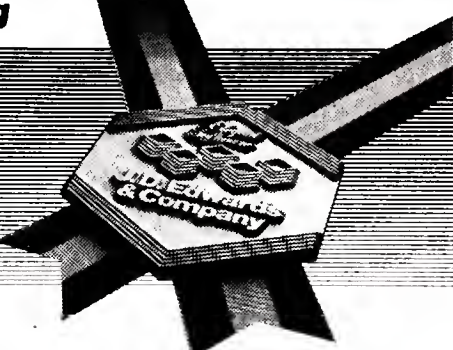


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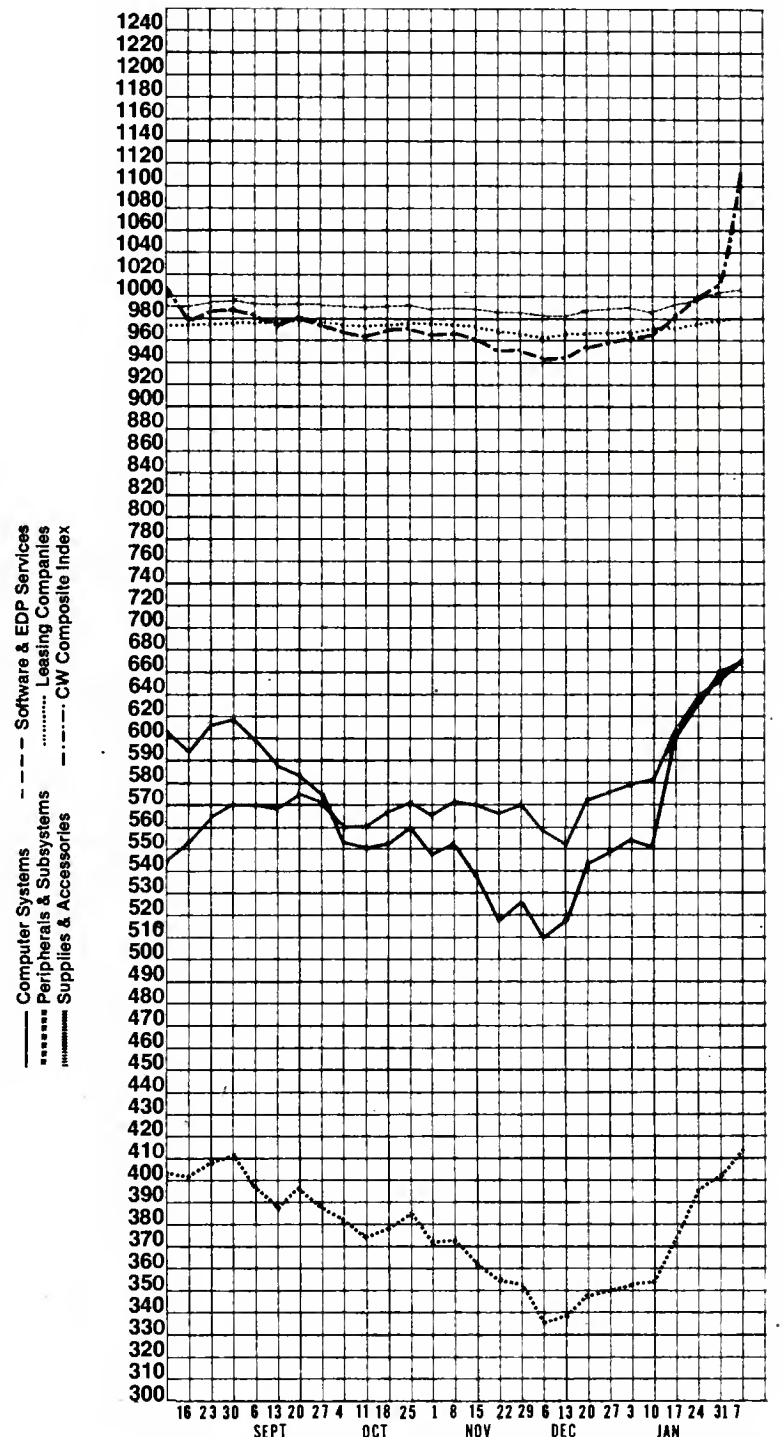
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N. TERAOTYNE 22-39 28 -2 1/2 -8.1

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L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
D=TO C. PRICES ARE AIO PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

1984-85 CLOSE WEEK WEEK
RANGE FEB 6 1985 CHNGE CHNGE
(1)

SOFTWARE & EDP SERVICES
D. ADVANCED COMP TECH 2-8 3 0 0.0
A. ADVANCED SYSTEMS INC 9-22 12 3/8 - 7/8 -6.6
D. AGS COMPUTERS INC 10-32 15 7/8 - 1/8 -0.7
D. AMERICAN SOFTWARE 12-31 18 7/8 +1 3/8 +7.8
N. ANACORP INC 2-19 3 1/4 - 1/8 -3.2
D. ANALYSTS INTL CORP 5-17 8 1/2 +1 1/4 +17.2
A. APPLIED DATA RES 18-38 38 +4 1/8 +12.1
D. ARHTON TATE 6-15 9 1/2 + 3/4 +3.2
D. ASK COMPUTER SYSTEMS 13-24 23 1/2 + 3/4 +3.2
S. ASTRODYNE CORP INC 1-7 1 3/4 + 1/8 +1.7
N. AUTOMATIC DATA PROC 30-45 45 1/8 +1 1/2 +1.1
D. COMPUTER ASSOC INT'L 15-35 23 3/4 - 1/4 -1.0
D. COMPUTER HORIZONS 8-20 7 7/8 - 1/2 -5.9
D. COMPUTER NETWORK 5-11 8 7/8 + 1/4 +2.8
N. COMPUTER SCIENCES 11-23 15 7/8 + 1/8 +0.7
D. COMPUTER TASK GROUP 12-18 19 + 1/2 +2.7
D. COMPUTER USAGE 1-18 7/8 - 1/8 -6.2
D. COMPUTONE SYSTEMS 4-23 7 3/4 + 1/4 +3.3
D. CONSERV CORP 1-16 3 5/8 0 0.0
D. CORSHARE 6-14 5 +1 1/4 +16.1

N. CULLINET SOFTWARE 12-30 30 1/8 +2 1/8 +7.5
D. CYCARE SYSTEMS INC 16-25 22 3/4 0 0.0
D. HOGAN SYSTEMS INC 7-27 7 1/4 + 1/8 +1.7
N. GENERAL ELECTRIC CO 45-64 63 1/4 - 5/8 -0.9
N. GTE CORP 36-48 41 7/8 -1 -2.3
N. INFORMATICS GENERAL 14-32 18 1/2 - 1/8 -0.6
G. INFORMATION SCIENCE 4-17 4 1/2 + 1/4 +5.8
D. INFOTRON SYSTEMS CP 15-43 19 -1 1/2 -7.3
D. KEANE ASSOCIATES 6-15 15 - 1/4 -1.6
A. LOGICON 18-31 30 5/8 - 1/4 -0.8
D. LOTUS DEVELOPMENT CP 15-40 30 3/4 + 3/4 +2.5
D. MCI COMMUNICATIONS 6-28 10 1/2 - 3/8 +1.2
D. MGT SCI AMER INC 9-33 13 -1 7/8 -12.6
D. MATHEMATICAL APP GRP 6-18 6 1/4 + 3/4 +13.6
D. MICOM SYSTEMS INC 27-50 34 - 1/4 -0.7
D. MICROPRO INT'L CP 2-10 3 1/8 + 3/8 +13.6
D. NATIONAL DATA CORP 8-26 11 1/2 + 3/4 +6.9
D. ON-LINE SOFTWARE INT 4-29 8 3/4 + 3/4 +12.5
D. PANORPHIC SYSTEMS 11-30 20 1/2 +1 7/8 +10.0
N. PLANNING RESEARCH 10-21 13 1/4 - 1/4 -1.8

D. POLICY MGT SYST CP 22-35 32 - 1/2 -1.5
D. PROGRAMING & SYS 4-8 5 5/8 - 3/8 -6.8
D. REYNOLDS & REYNOLD 28-53 40 1/4 +2 +5.2
D. SFI CORP 11-34 17 1/8 +1 1/8 +7.0
D. SHARED MEDICAL SYST 23-43 30 7/8 + 3/8 +1.2
D. SCIENTIFIC COMPUTERS 5-14 6 3/8 - 1/8 -1.8
D. SOFTWARE AD 9-21 20 1/2 - 7/8 -4.0
N. URS CORP 10-18 13 1/4 + 3/8 +2.8
N. UCCEL 7-17 15 + 1/4 +1.6

PERIPHERALS & SUBSYSTEMS

P. AM INTERNATIONAL 2-7 4 5/8 + 7/8 +23.3
A. ANDERSON JACOBSON 3-26 4 1/2 + 3/4 +20.0
D. AUTO-TROL TECHNOLOGY 8-28 10 3/4 + 1/4 +2.3
D. AVANT-GARDE COMPUTING 11-29 16 1/2 +1 1/2 +8.8
D. BANCORP INC 5-22 7 1/2 + 1/4 +5.4
A. BEEHIVE INT'L 1-7 5/8 0 0.0
N. BOLT-BERANEK & NEW 17-30 25 1/2 + 1/8 +0.4
D. CANEX CORP 1-3 2 - 1/4 -11.1
D. CENTRONICS DATA CORP 8-28 8 3/4 + 1/8 +1.3
A. CETEC CORP 7-12 8 3/4 + 3/8 +4.4
A. COGNITRONICS 4-20 6 1/8 + 5/8 +11.3

1984-85 CLOSE WEEK WEEK
RANGE FEB 6 1985 CHNGE CHNGE
(1)

A. COMPUGRAPHIC CORP 26-40 35 +3 1/2 +11.1
D. COMPUTER TRANSFER 1-10 7/8 - 1/8 -12.5
N. COMPUTERVISION CORP 29-53 43 7/8 + 5/8 +1.4
N. CONRAC CORP 11-24 14 - 3/8 -2.6
A. DATA-PRODUCTS CORP 14-32 19 + 7/8 +4.8
A. DATARAM CORP 4-12 5 1/2 - 1/4 -4.3
D. DATA SWITCH CORP 5-41 8 5/8 + 1/2 +6.1
D. DATUM INC 5-17 6 3/4 - 1/8 -1.8
D. DECISION DATA COMPUT 9-17 17 3/8 +2 1/8 +13.9
N. DECTEL-OLIVETTI 4-39 3 3/4 - 5/8 -14.2
N. ELECTRONIC M & R 5-11 5 7/8 - 1/8 -2.0
D. ENDATA INC 6-16 6 - 1/2 -7.4
D. EVANS & SUTHERLAND 11-50 15 1/8 - 3/8 -2.4
D. GANDOLF TECHNOLOGIES 9-14 11 5/8 - 5/8 -5.2
N. GEN'L DATA CORP INC 10-20 19 3/8 + 7/8 +4.7
N. HAZELTINE CORP 16-33 27 3/4 - 1/2 -1.7
D. IOT CORP 3-8 5 3/4 + 1/2 +9.5
D. INFORMATION INTL INC 10-19 13 1/2 0 0.0
D. INTECON INC 7-21 9 1/2 -1 1/4 -11.6

D. INTF. CORP 27-45 30 3/4 - 1/2 -1.5
A. LUNDY ELECTRONICS 7-18 11 3/4 - 3/4 -8.0
D. MEGADATA CORP 3-18 6 3/4 + 5/8 +10.2
A. MSI DATA CORP 9-25 11 3/4 +1 1/4 +11.9
N. NASHUA CORP 18-28 29 1/4 + 1/8 +0.4
D. NETWORK SYSTEMS CORP 16-34 28 3/8 + 3/8 +1.3
N. NO AMERICAN PHILIPS 30-44 43 3/4 +3 1/2 +8.6
N. NORTHERN TELECOM LTD 30-49 40 1/8 + 1/4 +0.6
D. OMEK 1-8 1/8 0 0.0
N. PARADYNE CORP 11-26 16 3/4 -1 -5.8
A. PENRIL CORP 8-14 13 1/2 + 7/8 +6.9
N. PLESSEY CO (AGR) 20-41 19 1/2 -1 1/2 -7.1
D. PRINTRONIX INC 13-34 16 3/8 + 3/4 +4.7
D. RARTEK CORP 4-23 5 1/4 + 1/2 +10.5
N. RECOGNITION EQUIP 10-17 15 5/8 +1 1/4 +8.6
N. SANDERS ASSOCIATES 32-120 36 5/8 -1 1/2 -3.9
D. SCAN-TROL CORP 8-18 13 1/2 - 1/8 -0.8
D. SCIENTIFIC ATLANTA 8-23 12 7/8 - 3/8 -2.8
D. SEAGATE TECHNOLOGY 4-20 7 3/8 - 1/8 -1.6
N. STORAGE TECHNOLOGY 2-23 3 5/8 + 1/8 +3.5

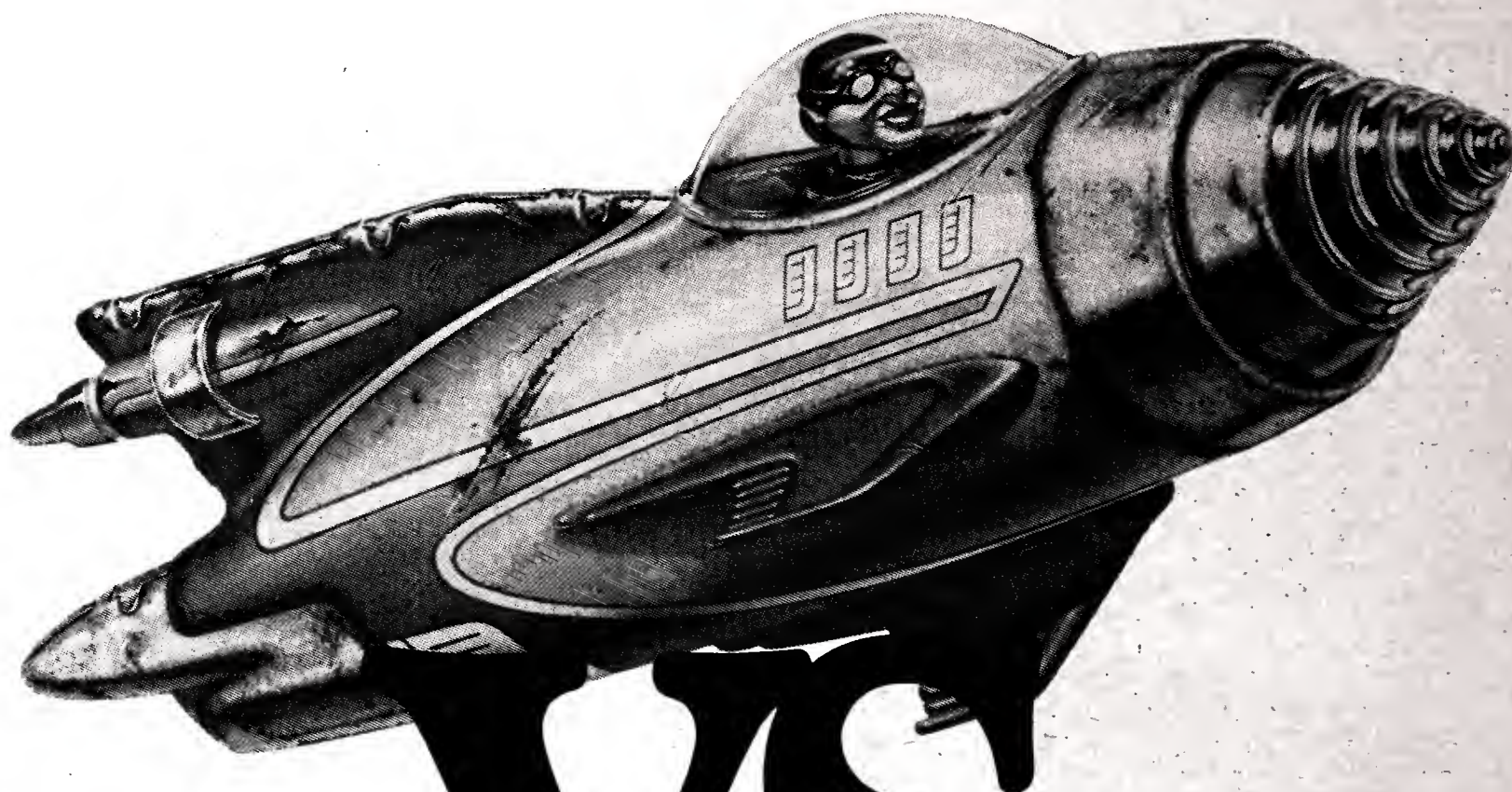
D. SYKES DATATRONICS 1-13 1 3/8 + 3/8 +46.5
D. SYSTEMS & COMP TECH 11-39 11 0 0.0
A. T BAR INC 7-17 8 3/8 - 1/8 -1.4
A. TAB PRODUCTS CO 13-20 17 1/2 +1 1/8 +6.8
D. TANDON CORP 8-35 7 + 1/2 +7.8
A. TEC INC 8-12 10 3/4 + 3/4 +7.5
N. TEKTRONIX INC 52-87 88 1/4 + 3/4 +1.1
N. TEFLEX 18-48 48 1/4 +3 +6.8
D. TESSDATA SYSTEMS CP 2-17 2 1/8 + 1/2 +30.7
N. TIMEPLEX INC 13-23 21 1/4 - 3/8 -1.7
D. VIRIAL TECHNOLOGY 2-26 2 - 1/4 -11.1

SUPPLIES & ACCESSORIES

N. AMERICAN BUS PRODS 17-23 23 + 3/8 +1.6
N. BARRY WRIGHT 21-33 27 + 1/4 +4.4
A. DUPLEX PRODUCTS INC 22-28 28 1/4 + 3/8 +1.2
N. ENNIS BUS. FORMS 18-36 35 7/8 +2 3/8 +7.0
N. JN COMPANY 68-80 83 3/4 - 1/2 -0.5
N. MDRP CORP LTD 35-51 50 3/4 0 0.0
D. STANDARD REGISTER 27-55 54 1/2 +5 1/2 +11.2
N. WALLACE CORP SERVICE 33-38 38 1/8 +2 1/4 +6.2

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